

REVISION OF THE NIRVANINAE (HOMOPTERA: CICADELLIDAE) OF THE INDIAN SUBCONTINENT

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ABSTRACT.—Three tribes of Nirvaninae, namely, Balbillini (two genera and three species), Nirvanini (five genera and 26 species), and Occinirvanini (one genus and one species), occur on the Indian subcontinent. The tribes, genera, and species are redescribed, illustrated, and keyed. New taxa recognized are *Balbillus indicus* n. sp. (India: Kerala), *Stenotortor subhimalaya* n. sp. (India: West Bengal), *Kana bispinosa* n. sp. (India: Tamil Nadu), *K. nigropicta* n. sp. (India: Kerala), *Sophonia bakeri* n. sp. (India: Karnataka, Kerala, Tamil Nadu, Uttar Pradesh; Nepal), *S. bifida* n. sp. (India: West Bengal), *S. complexa* n. sp. (India: Meghalaya), *S. complicata* n. sp. (India: Mizoram, Meghalaya), *S. keralica* n. sp. (India: Kerala), *Nirvana peculiaris* n. sp. (India: Mizoram, Meghalaya), and *N. striata* n. sp. (India: West Bengal, Uttar Pradesh, Himachal Pradesh). The genus *Quercinirvana* Ahmed & Mahmood (type species: *Q. longicephala* Ahmed & Mahmood) is treated as a junior synonym of *Sophonia* Walker. *Kana signata* Distant and *Nirvana greeni* Distant are suppressed as junior synonyms of *K. illuminata* and *N. linealis*, respectively, and are transferred to *Sophonia*. Three other species transferred to *Sophonia* are *Kana modesta* Distant, *Quercinirvana longicephala* Ahmed & Mahmood, and *Nirvana insignis* Distant. The relationships among various genera are discussed briefly. The genera *Crispina* Distant and *Mohunia* Distant are excluded from Nirvaninae.

The Nirvaninae, one of the smaller subfamilies of the leafhopper family Cicadellidae, include a predominantly tropical group of leafhoppers. They are fragile, often brightly colored, depressed leafhoppers and common on lush green vegetation. They are often mistaken for Typhlocybinae, but the structure of the head and the more depressed form and truncate basitarsus of the hind leg distinguish Nirvaninae. The subfamily includes 111 species (excluding Mukariinae and other non-Nirvaninae genera, which were traditionally included in the Nirvaninae) distributed in the Oriental (56), Afrotropical (24), Neotropical (7), Palearctic (7), Australian (11), and Pacific island (6) regions. The fauna of Afrotropical (Linnavuori 1979), Australian (Evans 1966), Papua New Guinea (Evans 1973), Neotropical (Kramer 1964), and Palearctic (Kuoh and Kuoh 1983) regions have recently been revised. The tribe Mukariini earlier included in the subfamily by Distant (1908g) and Metcalf (1963) is now considered a subfamily distinct from Nirvaninae (Linnavuori 1979).

Information on host plants of Nirvaninae is very meagre. *Nirvana pallida* Melichar and *N. suturalis* Melichar are destructive to sugarcane and grasses in Taiwan (Schumacher 1915a). They also feed on rice, mulberry, and camphor tree (Esaki and Ito 1954a). Baker

(1923a) found *Stenotortor inocarpi* Baker on Otaheite chestnut, *Inocarpus edulis*, in Singapore. In Australia, Nirvaninae feed on *I. edulis*, casuarina, and croton (Evans 1941f). *Tecomaria capensis* is recorded as the host of *Narecho tecomariae* Theron in South Africa (Theron 1970). *Quercinirvana longicephala* Ahmed & Mahmood feeds on *Aesculus indica*, *Quercus dilatata*, and *Viburnum nervosum* (Ahmed and Mahmood 1970). *Chudania delecta* Distant breeds on *Ficus carica* (Ahmed and Mallik 1972). In South America, *Tahura fowleri* Kramer is found on *Passiflora* (Kramer 1964). Kuoh and Kuoh (1983) recorded *Camellia sinensis*, *Acacia confusa*, *Citrus reticulata*, *Pterocarpus indicus*, *Oryza sativa*, *Psidium guajava*, and *Chimonanthus praecox* as host plants of species of *Pseudonirvana* Baker (= *Sophonia* Walker) in China. *Nirvana pallida* and *N. greeni* Distant breed on black gram, green gram, cowpea, field bean, pigeon pea, and soybean in India (Ramakrishna 1980).

The Nirvaninae of the Indian subcontinent consist of eight genera and 30 species grouped in three tribes, namely, Balbillini, Nirvanini, and Occinirvanini. The genera *Mohunia* Distant and *Crispina* Distant are excluded from the study, as they probably belong to the subfamily Deltocephalinae.

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MATERIAL AND ABBREVIATIONS

This study was based mainly on specimens collected over the years and deposited in the insect collection of the Department of Entomology, University of Agricultural Sciences by the senior author and his students. Additional specimens were borrowed from various institutions for the study. Abbreviations used for these institutions and for the depositories of the types of new taxa are as follows:

- BMNH – British Museum (Natural History), London.
 IARI – Indian Agricultural Research Institute, New Delhi.
 IRSNB – Institute Royal des Sciences, Naturelles de Belgique, Bruxelles.
 JU – Department of Biosciences, Jammu University, Jammu.
 PAU – Punjab Agricultural University, Ludhiana.
 UAS – University of Agricultural Sciences, Bangalore.
 USNM – U.S. National Museum (Natural History), Washington, D.C.
 ZMHU – Museum für Naturkunde der Humboldt, Universität zu Berlin, Berlin.
 ZSI – Zoological Survey of India, Calcutta.

Distant (1908g, 1918b) did not mention the number of specimens (syntypes) of each new species he described, except when a single specimen was involved, viz., *Chundania delecta* Distant (1908g: 268). In this study lectotype designations were made even though a single specimen of the type series (syntypes²) was present in the BMNH collection. Unless otherwise stated they were considered as part of the syntype series.

The terminology used for describing hind leg spinulation follows Davis (1975).

DESCRIPTION OF TAXA

Nirvaninae

Delicate, fragile, depressed, small to moderately large (4.0–9.0 mm) leafhoppers. Usually yellow or white, often marked with red, black, orange, or brown fascia. Head as wide as or wider than pronotum. Vertex usually flattened, strongly produced, and with rugae or sculpturing on lateral and anterior regions. Ocelli on crown along lateral margin in front of eyes. Frontoclypeus and clypellus either flat or tumid, in the latter case often provided with a median keel. Lora often small, extreme anterior margin of genae bluntly prominent, extending beyond apex of clypellus. Antennal pits deep, antennal ledges more or less strong, antennae long. Lower margin of eyes

sinuate ventrally. Anterior tentorial branches L-shaped. Lateral margins of pronotum carinate (except in *Omaranus* Distant), moderately long. Forewing venation reduced, without cross-veins at base (except Balbillini), longitudinal veins represented by a series of paired pits basally, appendix either narrow (Nirvanini) or broad (*Balbillus* Distant). Hindwing with three or four apical cells, veins 1A and 2A fused basally. Fore and middle tibiae cylindrical or flattened (Balbillini), hind femoral spinulation 2+1+1 (Nirvanini), 2+1+0 (Balbillini and Occinirvanini), or 2+0+0 (Balbillini).

Male pygofer either cylindrical or depressed, with or without anal collar process, but may be armed with ventral process, heavily macrosetose. Valve small, fused with pygofer laterally. Plates usually parallel-sided. Style variable. Connective Y-shaped (Nirvanini) or platelike (Balbillini). Aedeagus with single shaft and often provided with processes.

Linnavuori (1979) suggested that the subfamily Nirvaninae is a derivative of the Aphrodinae–Cicadellinae stock and that Nirvanini is the most advanced tribe.

Key to Tribes

1. Fore and middle tibiae flattened; head notched in front of eyes so that the scape is visible in dorsal aspect Balbillini
- Fore and middle tibiae rounded; scape not visible from above 2
- 2(1). Ocelli nearer to apex of head than to eyes; forewing appendix wide and extending around apical wing margin; lora large; vertex about half as long as wide, obliquely produced in front of eyes, with hind femoral spinulation 2+1+0; hind basitarsus with six platellae ... Occinirvanini
- Ocelli nearer to eyes than to apex of head; forewing appendix narrow and does not extend around apex of wing; lora small; vertex as long as wide or longer, not obliquely produced in front of eyes; hind femoral spinulation 2+1+1; hind basitarsus with two or three platellae ... Nirvanini

Tribe Balbillini

This tribe has been well characterized by Linnavuori (1979). The following additional characters are noted. Forewing with supernumerary cross-veins along costal margin and with two m-cu cross-veins, four to five apical cells, two anteapical cells, and appendix (absent in *Stenotortor* Baker). Hindwing with four apical cells. Hind femoral spinulation

2+2+0 or 2+0+0. Male connective long and incrassate or lamellate and fusiform. Aedeagus simple with large gonopore.

Key to Genera of Balbillini

- 1. Forewing with a well-developed appendix; hind femoral spinulation 2+1+0 *Balbillus* Distant
- Forewing without an appendix; hind femoral spinulation 2+0+0 *Stenotortor* Baker

Genus *Balbillus* Distant

Balbillus Distant 1908g: 287. Type species: *Balbillus granulatus* Distant, by original designation and monotypy.

Head narrower than pronotum. Crown bluntly, angularly produced, convex, declivous anteriorly, with median and submarginal, anterior carinae between ocelli. Face horizontal, flat. Clypellus twice as wide at base as at apex; lora small. Lateral margins of head in front of eyes notched, exposing scape of antenna. Pronotum declivous laterally, with two lateral, carinate margins; mesepisternum attaining lateral position in front of base of wing and strongly ridged. Fore and middle tibiae angular; hind femoral spinulation 2+1+0, inner spine very slender and minute. Apex of hind basitarsus with three platellae. Hind tibial spinulation R₁ 12 ± 1, R₂ 19 ± 1, R₃ 25 ± 1, R₄ 25 ± 1.

Pygofer much shorter than its height, without processes. Anal tube short. Genital plate parallel-sided, 3.4 times as long as wide with uniseriate, submarginal setae and few hairlike setae. Apophysis of style simple, without preapical lobe. Connective lamellate and fusiform. Aedeagus articulate with connective, simple and with large gonopore.

REMARKS.—As pointed out by Linnavuori (1979) and Baker (1923), *Balbillus* and *Stenotortor* are closely related. They can be separated by the characters used in the key. The bodies of both genera remain appressed to the leaf surface, which explains the flat nature of the tibiae and the undersurface of the body.

The Indian species, *B. granulosa* and *B. indica*, have hind femoral spinulation 2+1+0 and three platellae at the apex of the hind basitarsus. The male plate of *B. indica* is parallel-sided. The connective and aedeagus are articulated rather than fused. The connective is spindle-shaped, lamellate rather than long and incrassate, and the preapical lobe of the style is wanting. These characters strongly

suggest that the Afrotropical species of *Balbillus*, namely, *B. abas* Linnavuori and *B. trimaculatus* Linnavuori, may not belong to *Balbillus*.

Key to Species of *Balbillus*

- 1. Vertex and scutellum with dark brown spots *granulosus* Distant
- Vertex and scutellum immaculate *indicus*, n. sp.

Balbillus granulatus Distant

Figs. 1-5

Balbillus granulatus Distant 1908g: 288. Holotype ♀, Sri Lanka (BMNH, examined).

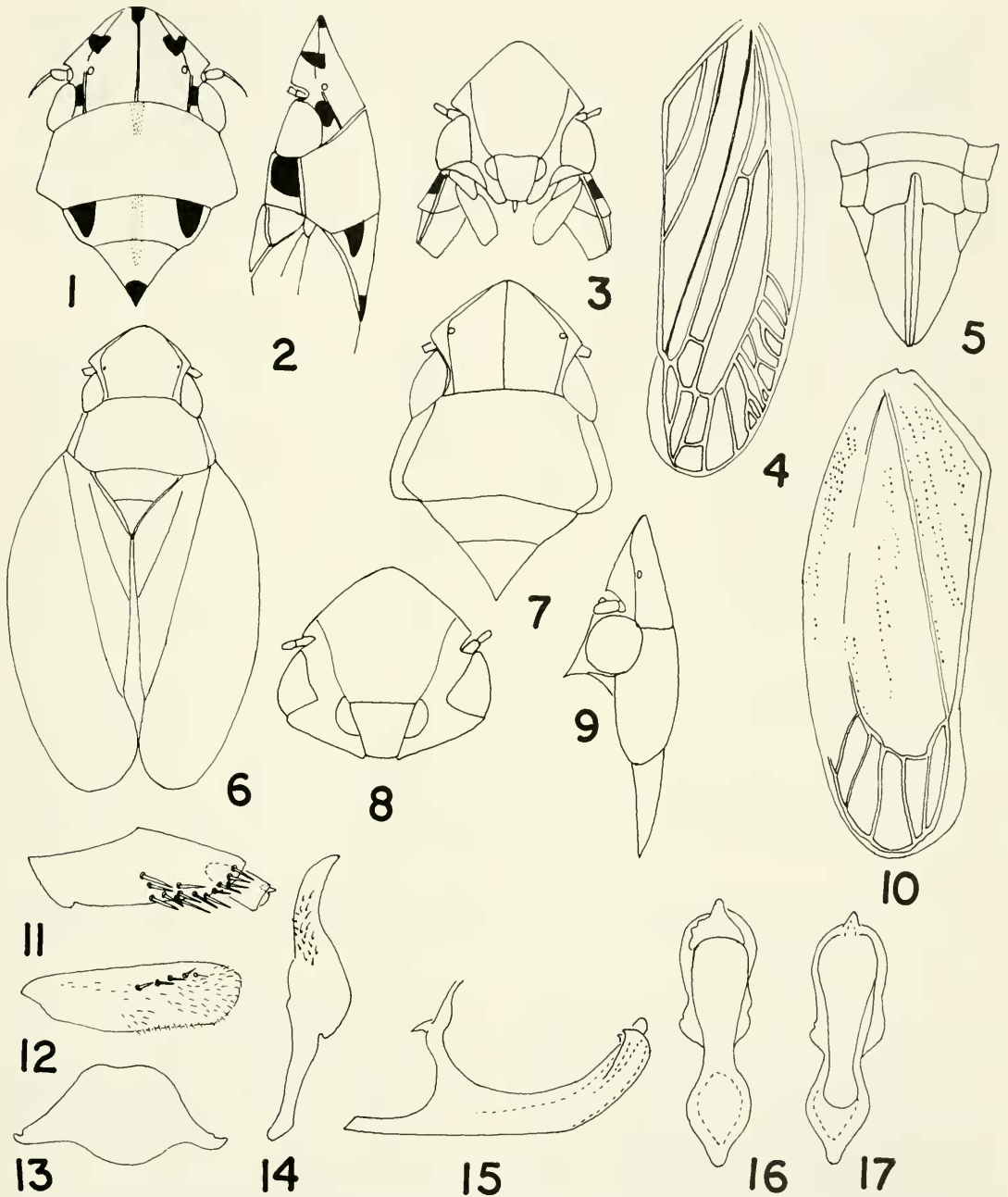
Yellow. Vertex with a median spot, a spot in apical half on either side divided by carina, and a spot near inner margin of eye dark brown. Pronotum with a median, short stripe on anterior margin fuscous. Basal triangles on scutum and apex of scutellum dark brown; blackish, median line on scutellum not reaching apex of scutellum. Longitudinal veins and claval veins lemon yellow, entire surface of forewing punctate, punctations along radial vein and on outer apical cell and a spot at base of appendix fuscous.

Vertex bluntly conical, 1.24 times as wide between eyes as its median length, median carina prominent in its apical half, apical 0.75 of disc sculptured, basal 0.25 polished. Face about as long as wide. Pronotum widened posteriorly. Scutellum longer than pronotum, transversely, finely rugulose beyond sulcus. Forewing 3.4 times as long as wide, with one m-cu cross-vein about 0.33 distance from base and another near apex limiting the short, inner anteapical cell, outer anteapical cell open behind, numerous veins arising from apical half of outer anteapical cell and reaching costa, few of them forked at costal margin, third apical cell divided by cross-vein. Hindwing with four apical cells.

FEMALE GENITALIA.—Seventh sternum about twice as long as sixth, its hind margin slightly concave with a strong, U-shaped, median excavation, very finely, transversely rugulose. Ovipositor exceeding pygofers.

MEASUREMENTS.—Female 7.10 mm long, head 1.85 mm wide, pronotum 1.87 mm wide.

SPECIMEN EXAMINED.—Holotype ♀ labeled /Type/ /*Balbillus granulatus* Dist., type/ /Ceylon (Green)/ /Distant Coll., 1911-383/ (BMNH).



Figs. 1-17. Species of *Balbillus*. *B. granulosis* Distant: 1, head and thorax; 2, same, profile; 3, face and part of prothorax; 4, forewing; 5, ovipositor. *B. indicus*, n. sp.: 6, general habitus; 7, head and thorax; 8, face; 9, head and thorax, profile; 10, forewing; 11, pygofer; 12, male plate; 13, connective; 14, style; 15, 16, 17, aedeagus, lateral, cephalic, and caudal views.

REMARKS.—This species is closely related to *B. indicus*, from which it differs by its distinctive coloration.

Balbillus indicus, n. sp.

Figs. 6-17

Uniformly pale yellow. Apex of clavus,

second and third apical cells of forewing suffused with brown.

Disc of vertex polished, medially, longitudinally grooved for 0.66 distance and ridged beyond. Forewing 2.5 times as long as wide, punctate along veins of corium, in cells of clavus, and along the costal margin, m-cu cross-veins two (as in *B. granulosis*) but not easily seen, fewer oblique veins reaching costal margin from outer anteapical cell.

MALE GENITALIA.—Pygofer simple, three times as long as its height with a few stout setae on caudoventral area, anal tube short. Plate parallel-sided, with single row of submarginal, stout, short setae, and hairlike setae along outer margin. Style without preapical lobe, apophysis long, its apex pointed and directed ventrad. Aedeagus with preatrium elongate, dorsal apodeme unpaired, short, shaft tubular for greater distance caudad, then flattened and deflected anteriorly, apex pointed; gonopore apical, large.

MEASUREMENTS.—Male 5.50 mm long, head 1.28 mm wide, pronotum 1.53 mm wide.

SPECIMEN EXAMINED.—Holotype ♂, India: Kerala: Thekkadi, 27.iii.1977, S. Viraktamath Coll. (UAS).

REMARKS.—In coloration and size it is similar to *B. albellus* Baker from the Philippines, but differs in forewing venation in having five apical cells rather than four as in the latter species.

Genus *Stenotortor* Baker

Stenotortor Baker 1923a: 375, 377. Type species: *Stenotortor inocarpi* Baker, by original designation and monotypy.

Structure similar to *Balbillus* but differs in the following respects. Orange with brick red or reddish brown markings. Median carina of vertex more prominent. Forewing without appendix, with one m-cu cross-vein, both anteapical cells open behind. Hind femoral spinulation 2+0+0. Hind tibial spinulation R₁ 20, R₂ 13, R₃ 10. Apex of hind basitarsus with three platellae.

Male pygofer simple, its caudoventral area thickly setose. Anal tube short. Male plate parallel-sided without macrosetae or long, hairlike setae. Style with well-developed, preapical lobe. Connective triangular, articulated with simple aedeagus. Gonopore large on ventral margin.

REMARKS.—Baker (1923a) differentiated *Stenotortor* from *Balbillus* by its strongly depressed body, tectiform tegmina with expanded costal area, strongly curved outer margin, and obscure venation. However, more important differences in *Stenotortor* appear to be the absence of an appendix on the forewing, the presence of one m-cu cross-vein, and hind femoral spinulation that is 2+0+0.

Stenotortor subhimalaya, n. sp.

Figs. 18–27

Orange yellow. Vertex with oblique band on either side of median line, oblique line laterally; pronotum with lateral, oblique band, transverse band on scutellum dark reddish brown. Forewing with submarginal band on costal area, a stripe on clavus along commissure at basal 0.33 and then obliquely extending to inner claval margin, a median stripe connecting both claval stripe basally and inward extension of submarginal stripe both medially and caudally, dark reddish brown.

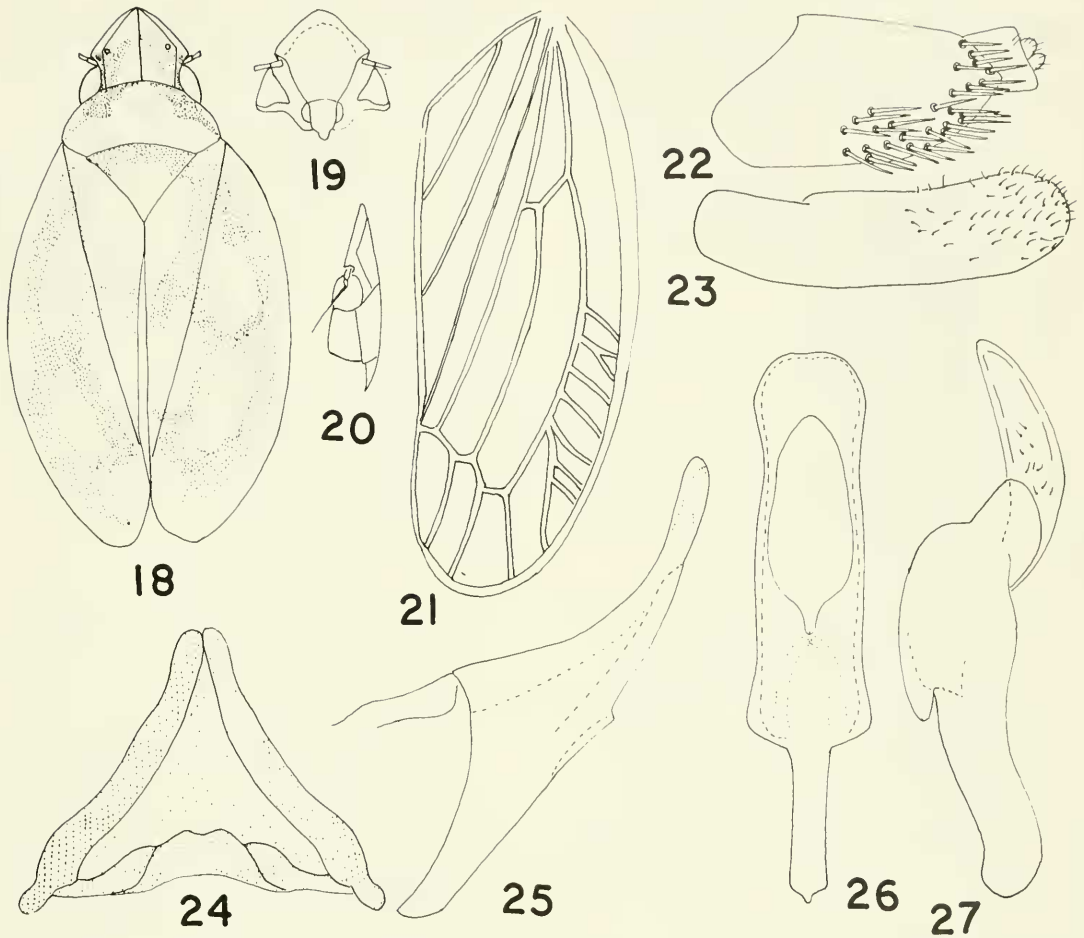
Vertex bluntly conical, slightly longer than its width between eyes. Face about as wide as long. Clypellus strongly narrowed apically. Lateral margin of pronotum strongly diverging, 2.7 times as wide as its median length. Forewing 2.4 times as long as its width. Hindwing with four apical cells.

MALE GENITALIA.—Pygofer twice as long as height, caudoventral margin with short, stout setae. Anal tube short. Male plate parallel-sided, about four times as long as wide, caudal apex rounded. Style with well-developed, stout, preapical lobe, apophysis fingerlike. Connective triangular. Aedeagus with elongate preatrium, without dorsal apodeme, shaft tubular in basal 0.33, then spatulate with large gonopore on its ventral margin occupying 0.66 of its length.

MEASUREMENTS.—Male 4.90 mm long; head 1.18 mm wide, pronotum 1.55 mm wide.

SPECIMENS EXAMINED.—Holotype ♂, India: West Bengal: Sukna, 3.xi.1981, C. A. Viraktamath Coll. no. 277 (UAS).

REMARKS.—This species differs from *S. inocarpi* in coloration of the vertex, pronotum, and wing pattern, in its larger size, and in its relatively longer aedeagus.



Figs. 18–27. *Stenotortor subhimalaya*, n. sp.: 18, habitus; 19, face; 20, head and thorax, profile; 21, forewing; 22, pygofer; 23, male plate; 24, connective; 25, 26, aedeagus, lateral and caudal views; 27, style.

Tribe Nirvanini

Pale yellow with dark or red markings. Body long, narrow, more or less depressed. Head as long as or longer than its width, disc of vertex longitudinally rugose in anterior region. Ocelli near lateral margins in front of eyes. Face with anterior, median carina and usually with lateral, oblique ridges on frontoclypeus. Gena narrow, lora small. Antennal pits rather deep, near anterior margin of eyes not visible from above; antennae long, reaching at least hind margin of pronotum. Forewings narrow, with reduced appendix and venation indistinct basally, second apical cell not widened apically. Hindwing with three or four apical cells. Fore and mid-

dle tibiae rounded. Hind femoral spination 2+1+1. Hind basitarsus terminated by two platellae.

Pygofer with well-developed, lateral lobes. Anal tube elongate, often with apical or caudoventral process. Male plate elongate, longer than pygofer and apically rounded. Style variable, usually with slender apophysis that is curved, hooked, or avicephaliform. Connective free, Y-shaped. Aedeagus weakly sclerotized, usually with appendages.

REMARKS.—This group is most abundant among Nirvaninae and appears highly evolved compared to other tribes, considering the reduced wing venation, the more streamlined body form, and the specialized male genitalia.

Key to Genera of Nirvanini

- 1. Hindwing with four apical cells (Fig. 59) 2
- Hindwing with three apical cells (Fig. 100) 3
- 2(1). Most parts of head, pronotum, and scutellum black dorsally; frontoclypeus and clypellus tumid (Figs. 85, 86); male connective rather T-shaped (Fig. 95) *Chudania* Distant
- Dorsum of head, pronotum, and scutellum at most with black, narrow stripe terminated by round spot (Figs. 50, 60); frontoclypeus and clypellus flat (Figs. 29, 45, 49); male connective Y-shaped (Figs. 32, 75) *Kana* Distant
- 3(1). Crown of head depressed in middle, margined by carina around its margin (Figs. 268, 269); male plate with angulate projection on its lateral margin near apex (Fig. 272); male style short, stout, appearing like loosely closed fist (Fig. 273) *Ophiuchus* Distant
- Crown of head either flat or convex; male plate either smoothly rounded near apex or with spine; style variable (Figs. 111, 148, 160, 182), slender and with slender apophysis that is curved, hooked, or avicephaliform 4
- 4(3). Dorsal apodeme of aedeagus robust, bearing processes at least at base of shaft (Figs. 118, 139, 150, 171, 180, 206); male plate about four times as long as its width at its midlength (Figs. 114, 149, 170, 196); frontoclypeus with prominent, lateral ridges *Sophonia* Walker
- Dorsal apodeme of aedeagus slender, U-shaped, without prominent processes (Figs. 225, 240, 254, 267); male plate five times or more as long as its width at its midlength (Figs. 227, 264); frontoclypeus with weak, lateral ridges *Nirvana* Kirkaldy

Genus *Kana* Distant

Kana Distant 1908g: 285. Type species: *Kana thoracica* Distant, by original designation.

Pale yellow, often with bright-colored patches and stripes. Crown slightly (less than 1.5 times) longer than its width. Ocelli placed laterad of submarginal carina. Frontoclypeus with anterior ridge, rather flattened, with lateral, very prominent, ridgelike folds. Clypellus large, broad at base. Lora small. Face slightly longer than wide between eyes. Second apical cell of forewing parallel-sided. Hindwing with four apical cells. Hind tibial spinulation R_1 20, R_2 12 ± 1 , R_3 23. Hind basitarsus with two platellae.

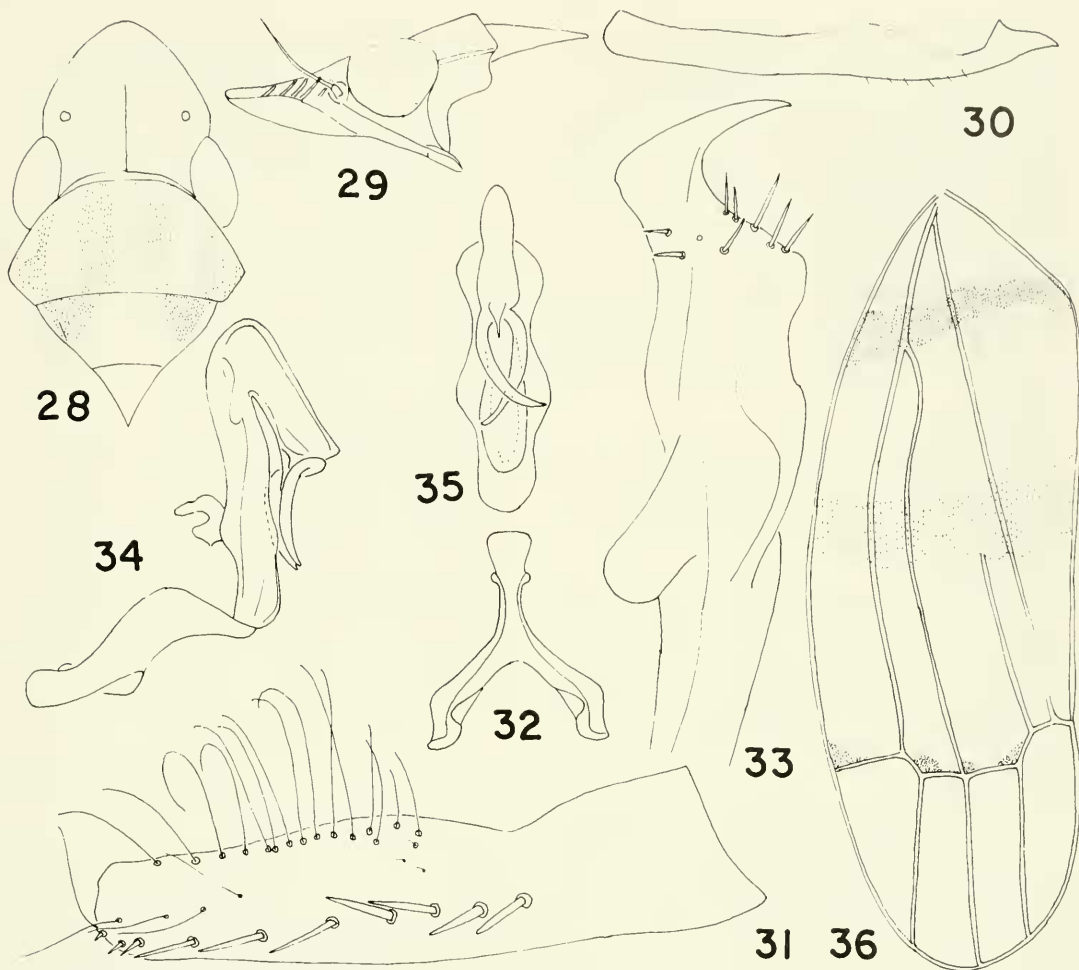
Pygofer rounded caudally, with one or two rows of submarginal macrosetae; ventral process robust at base, narrowed apically. Male plate elongate, narrow, with outer margin sinuate. Connective Y-shaped, with arms joining broadly; apophysis robust, short, with slender apical extension. Aedeagus partially sclero-

tized, often depressed, with lateral, lamellate margin, gonopore surrounded by membranous tube with or without process, dorsal apodeme reduced.

REMARKS.—Some species of *Kana*, especially *K. bispinosa* and *K. nigropicta*, resemble externally the species of *Sophonia*. The four closed apical cells in the hindwing, however, distinguish this genus from *Sophonia* and *Nirvana*. The aedeagus of *Kana* is characteristic in that it is bent in its apical half and bears appendages surrounding the gonopore; the second apical cell on the forewing is not narrowed apically as is the case in both *Sophonia* and *Nirvana*. *Kana* is closely related to *Yaoundea* Linnavuori and even may prove to be synonymous with it. Both genera are related to *Chudania*, from which they differ in having a flatter frontoclypeus.

Key to Species of *Kana*

- 1. Vertex, pronotum, and scutellum traversed by a median, longitudinal, black line (Figs. 50, 60); third apical cell of forewing with large, round, black spot (Figs. 58, 61) 2
- Vertex or pronotum or both either immaculate or with yellow, reddish, or orange stripes (Figs. 42, 44); forewing with brown or reddish orange, oblique, or transverse bands, black spot on third apical cell, if present very small (Figs. 36, 45, 47, 79) 3
- 2(1). Vertex without black spot near apex (Fig. 50); aedeagal shaft with pair of pronglike processes (Fig. 55) *bispinosa*, n. sp.
- Vertex with black spot near apex (Fig. 60); aedeagal shaft without processes (Fig. 67) *nigropicta*, n. sp.
- 3(1). Forewing with transverse bands only (Figs. 36, 79) 4
- Forewing with both oblique and transverse bands (Figs. 43, 47) 7
- 4(3). Forewing with single, broad, mottled brown, transverse band, area beyond apical cross-vein fuscous; vertex and pronotum marked with white stripes; male genitalia as in Figs. 74–78 *illaborata* Distant
- Forewing with two bands either both yellowish, orange, or red, or one orange red (more basal) and the other fuscous (median); apical cells at most with a few fuscous spots 5
- 5(4). Pronotum without colored stripes; vertex with clear yellow, longitudinal stripe on each lateral side; forewing with two transverse, yellow fasciae *decora* (Melichar)
- Pronotum with orange stripes; vertex either immaculate or with orange-yellow, submarginal, apically converging stripes; forewing with basal, orange-yellow or red, and median, fuscous, transverse stripe 6



Figs. 28–36. *Kana ordinata* Distant: 28, head and thorax; 29, same, profile; 30, ventral pygofer process; 31, male plate; 32, connective; 33, style; 34, connective and aedeagus, lateral view; 35, aedeagus, caudal view; 36, forewing.

- 6(5). Vertex with pair of anteriorly converging, orange-yellow stripes continued on pronotum *fasciata* Pruthi
- Vertex without stripes; pronotum with four orange stripes; male genitalia as in Figs. 30–35 *ordinata* Distant
- 7(3). Pronotum with two median, red stripes and two lateral, anterior, lemon yellow spots (Figs. 44); forewing with two red, transverse bands on corium (Fig. 47) *thoracica* Distant
- Pronotum with anterior margin and two spots on posterior margin orange-yellow (Fig. 42); corium of forewing with three transverse, red bands (Fig. 43); male genitalia as in Figs. 37–41 *ramificata* Distant

Kana ordinata Distant
Figs. 28–36

Kana ordinata Distant 1908g: 287. Lectotype ♂, Sri Lanka (BMNH, examined).

Yellow. Pronotum with two inner and two outer orange stripes joined posteriorly in male. Scutellum with brownish basal triangles. Forewing with reddish orange band across basal area, fuscous speckled band about midlength and series of fuscous spots at apices of anteapical cell.

Head slightly narrower than pronotum. Vertex of head slightly longer than its width between eyes (112:123), apex bluntly conical. Face with four prominent, lateral ridges.

MALE GENITALIA.—Pygofer rather squarish with caudodorsal area angulate, and with two rows of stout, long setae; ventral process with triangular, dorsal lobe and median, dorsal hump. Plate with rounded, caudal apex, with row of stout setae in caudal 0.66 and with

marginal row of long, hairlike setae. Style with well-developed, preapical lobe, apophysis short, stout, its apical extension slender, avicephaliform. Connective Y-shaped with stem as long as the length of arms. Aedeagus tubular with unsclerotized, poorly developed dorsal apodeme. Shaft strongly bent and directed ventrad and cephalad in apical 0.33, appearing rather like a compressed, inverted J, cephalic part of shaft laterally expanded and constricted in middle in cephalic view; caudal part with two long, curved processes that cross over and are longer than those in *K. ramificata*.

MEASUREMENTS.—Male body 3.00 mm long, forewing 4.10 mm long, head 1.17 mm wide, pronotum 1.25 mm wide. Female 6.40 mm long, head 1.30 mm wide, pronotum 1.32 mm wide.

SPECIMENS EXAMINED.—Lectotype ♂ labeled /Bogawantalawa, Ceylon, April/ /Distant Coll., 1911–383/ /1625/ /*Nirvana ordinata* Dist., type/ here designated (BMNH). Paralectotype ♀ labeled /Maskeliya, Ceylon, 8–05/ /Distant Coll., 1911–383/ here designated (BMNH).

REMARKS.—*Kana ordinata* is closely related to *K. ramificata* and differs in coloration and structure of the pygofer process. *Kana ordinata* has a shorter caudal part of the aedeagus and longer processes that cross over.

Kana ramificata Distant
Figs. 37–43

Kana ramificata Distant 1908g: 286. Lectotype ♂, Sri Lanka (BMNH, examined).

Pale yellow, with submarginal band on vertex, anterior margin of pronotum and two spots on posterior margin orange. Scutellum golden yellow. Forewing with basal band connected by similar but more oblique band from costa to clavus and then continued on clavus but not reaching claval tip, orange; another oblique band with well-defined, orange, anterior margin and cross-veins limiting apical cells, reddish; spot at apex of clavus and another on third apical cell fuscous.

Head slightly narrower than pronotum (46:49). Vertex slightly longer than width between eyes, bluntly conical. Lateral ridges on face four in number, not prominent. Scutellum longer than pronotum.

MALE GENITALIA.—Pygofer rather squarish, with caudal tufts of long, stout setae; ventral process stout with dorsal, triangular process near caudal apex. Anal tube stout. Male plate with oblique row of stout setae in caudal 0.66, with long, hairlike setae, apex bluntly rounded. Style and connective as in *K. ordinata*. Aedeagus as in *K. ordinata*, but caudal bent part 0.66 as long as tubular cephalic part, apical processes shorter.

MEASUREMENTS.—Male 5.20 mm long, head 1.15 mm wide, pronotum 1.22 mm wide.

SPECIMEN EXAMINED.—Lectotype ♂ labeled /Green, Ceylon, 95–221/ /*Nirvana ramificata* Dist., type/ here designated (BMNH).

REMARKS.—*Kana ordinata* and *K. ramificata* share a similar basic pattern of male genitalia; however, they differ in the relative size of the aedeagal processes and the shape of the pygofer process. Both hindwings and the right side of the forewing of the lectotype are damaged and were placed in a microvial.

Kana thoracica Distant
Figs. 44–48

Kana thoracica Distant 1908g: 285. Lectotype ♀, Sri Lanka (BMNH, examined).

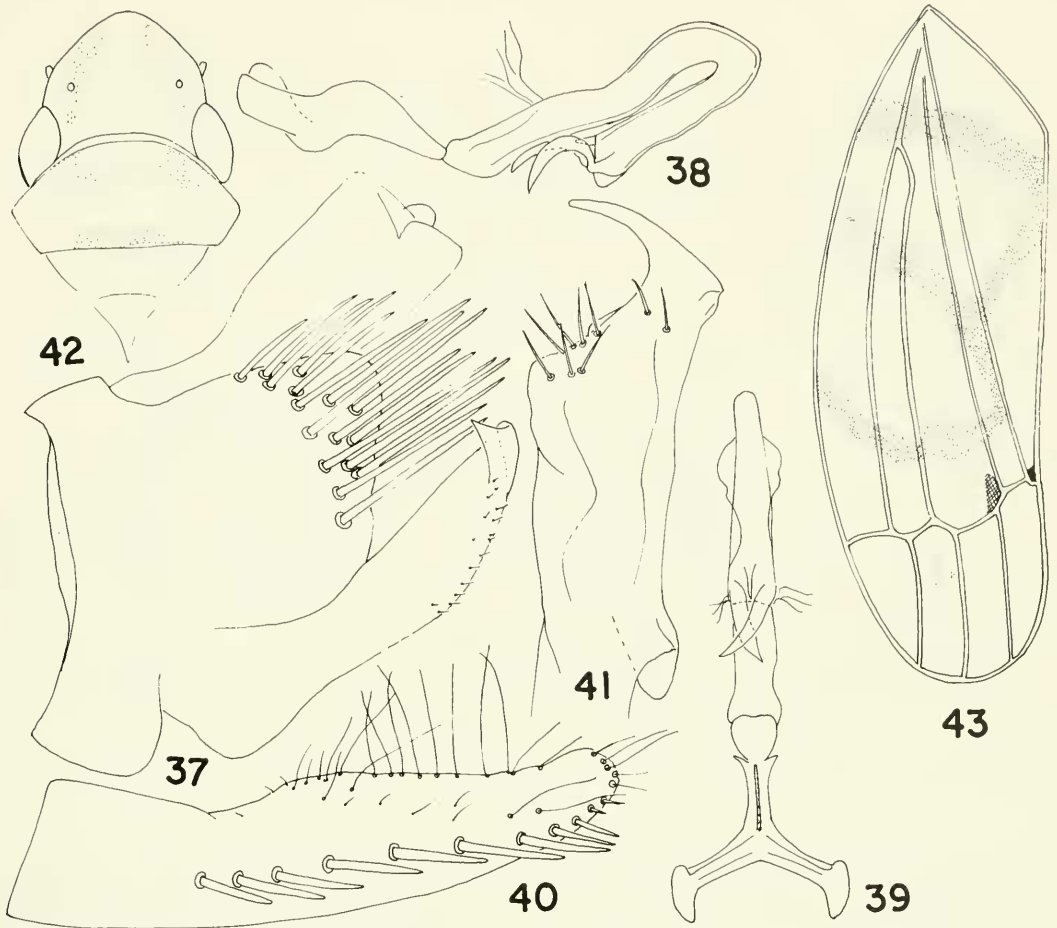
Pale yellow. Two anteriorly converging, submarginal stripes on vertex, two stripes one on either side of median line red, two lateral spots on anterior margin of pronotum lemon yellow. Forewing with red bands (Fig. 47) along anal margin, obliquely crossing over to clavus; short band on corium near base, another longer, oblique band about midlength from costal margin to clavus. Series of spots on either side of cross-veins separating apical cells fuscous.

Head narrower than pronotum (46:50). Vertex longer than its width between eyes (37:26). Face with three lateral, oblique ridges; longer than width including eyes. Pronotum shorter than both vertex (24:37) and scutellum (24:28).

FEMALE GENITALIA.—Hind margin of seventh sternum slightly concave with a median protuberance.

MEASUREMENTS.—Female 5.90 mm long, head 1.15 mm wide, pronotum 1.25 mm wide.

SPECIMEN EXAMINED.—Lectotype ♀ labeled /Pundaloya, Ceylon/ /Ceylon, Green



Figs. 37–43. *Kana ramificata* Distant: 37, male pygofer; 38, connective and aedeagus, lateral view; 39, same, caudal view; 40, male plate; 41, style; 42, head and thorax; 43, forewing.

Coll. 90–115/ *Nirvana thoracica* Dist., type/ here designated (BMNH).

REMARKS.—This species appears to be related to *K. ramificata* and *K. ordinata*, from which it differs in coloration.

Kana bispinosa, n. sp.

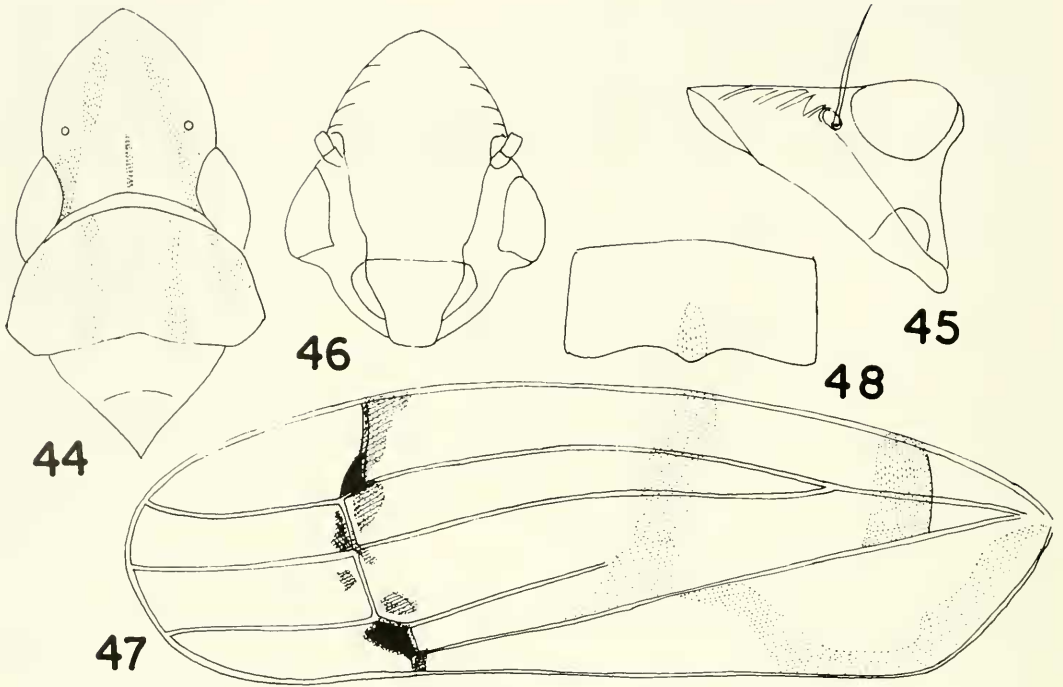
Figs. 49–59

Pale yellow. Vertex with median, longitudinal, black line from before apex and extending to the tip of scutellum, gradually widening posteriorly, lateral margin orange. Pronotum reddish. Forewings with suffused, red stripe adjoining thin, light brown stripe terminating on claval suture at 0.66 distance from base on anal margin, corium pinkish distally, claval apex and apical wing margin brown, third apical cell with large, black spot, surrounding area light brown, costal

margin with three reddish fascia.

Head narrower than pronotum. Vertex slightly longer than width between eyes, flat, slightly depressed about center, apex bluntly conical, granulose. Apical half of face convex, basal half depressed, with three oblique ridges.

MALE GENITALIA.—Pygofer rounded, with stout, long setae along caudal margin; ventral process broad basally, abruptly narrowed and curved dorsally near apex. Male plate about four times as long as wide, distal 0.66 with an oblique row of stout spines and with marginal, hairlike setae. Style with stout, preapical lobe and short, stout apophysis, apical extension slender, beaklike. Connective Y-shaped with arms as long as stem. Aedeagus with short, well-developed preatrium; shaft with ridged



Figs. 44–48. *Kana thoracica* Distant: 44, head and thorax; 45, head, profile; 46, face; 47, forewing; 48, female seventh sternum.

lateral margins, somewhat rectangular, median ridge on caudal aspect running from base to apex, gonopore surrounded by membranous, tubelike structure bearing pair of ventrally directed, pronglike processes.

MEASUREMENTS.—Male 4.50 (4.50–4.60) mm long, head 0.93(0.90–0.95) mm wide, pronotum 0.99 (0.98–1.00) mm wide.

SPECIMENS EXAMINED.—Holotype ♂, India: Tamil Nadu: Naduvattam, 6.vi.1977, C. A. Viraktamath Coll. (UAS). Paratypes 2 ♂, data as in holotype but collected by S. Viraktamath (BMNH, UAS).

REMARKS.—This species is closely related to *Kana nigropicta* but only distantly related to *K. illaborata* and *K. ordinata*. It differs from the latter two species in coloration of the head, thorax, and forewing and in the structure of male genitalia.

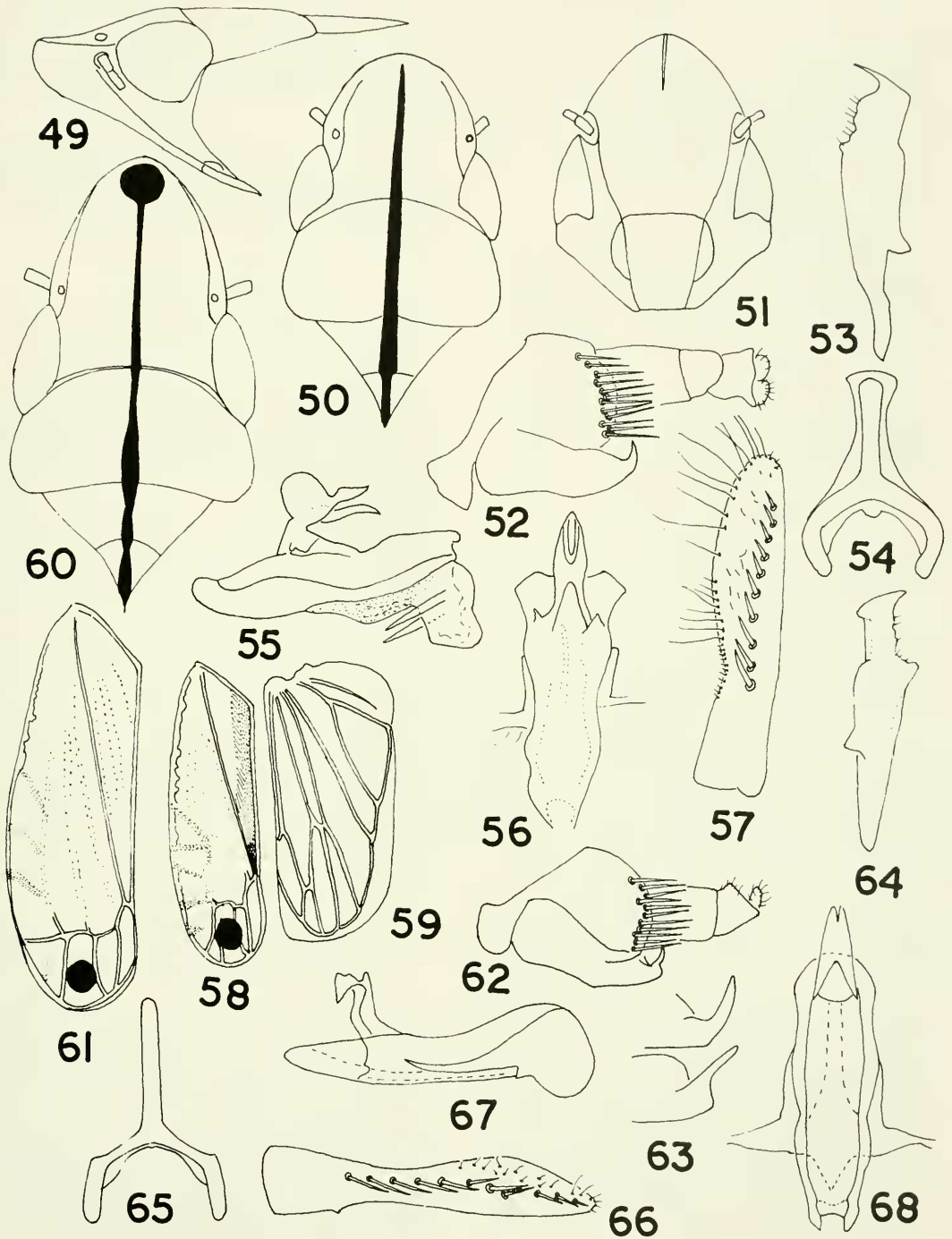
Kana nigropicta, n. sp.
Figs. 60–68

Uniformly orange-yellow. Vertex with round, black spot near apex, contiguous with median, longitudinal, black line extending to tip of scutellum. Lateral margins of vertex and

pronotum orange. Forewing with irregular, hyaline patches, claval apex brown, third apical cell with large, black spot, apical margin reddish, costal margin with three red, oblique fasciae, black spot in fourth apical cell.

Head as wide as pronotum. Vertex about 1.5 times as long as wide, anterior half convex, faintly granulose. Apical 0.25 of face slightly bulged with four lateral, oblique ridges. Pronotum transversely, finely rugulose. Scutellum longer than pronotum.

MALE GENITALIA.—Pygofer roundish with macrosetae along caudal margin; ventral process broad basally, abruptly narrowed near apex to mesally directed, pointed process. Anal tube moderately long. Male plate more than four times as long as wide, single row of macrosetae on caudal 0.75. Style with small, preapical lobe, apophysis stout with short, relatively stout apical extension. Connective Y-shaped with stem longer than arm. Aedeagus flattened, elongate with lateral, marginal, poorly sclerotized ridge, dorsal apodeme very short, gonopore large, on caudal margin, surrounded by membranous extension caudally.



Figs. 49-68. Species of *Kana*: *K. bispinosa*, n. sp.: 49, head and thorax, profile; 50, same, dorsal view; 51, face; 52, male pygofer; 53, style; 54, connective; 55, 56, aedeagus, lateral and ventral views; 57, male plate; 58, forewing; 59, hindwing. *K. nigropicta*, n. sp.: 60, head and thorax; 61, forewing; 62, male pygofer; 63, apex of ventral process of pygofer in two views; 64, style; 65, connective; 66, male plate; 67, 68, aedeagus, lateral and caudal views.

FEMALE GENITALIA.—Hind margin of seventh sternum almost straight. Ovipositor exceeding pygofer.

MEASUREMENTS.—Male 4.35 (4.20–4.50) mm long, head 0.92 (0.90–0.95) mm wide, pronotum 0.95 (0.90–0.95) mm wide. Female 5.13 (5.00–5.20) mm long, head 1.03 (1.00–1.08) mm wide, pronotum 1.11 (1.08–1.15) mm wide.

SPECIMENS EXAMINED.—Holotype ♂, India: Kerala: Thekkadi, 26.iii.1977, C. A. Viraktamath Coll. (UAS). Paratypes: 5 ♂, 2 ♀, data as in holotype but collected on 27.iii.1977 by C. A. Viraktamath (2 ♂, 1 ♀) (BMNH, USNM, UAS).

REMARKS.—This species can be easily recognized by the round, black spot on the vertex and the absence of processes on the membranous tube surrounding the gonopore.

Kana illaborata Distant

Figs. 69–79

Kana illaborata Distant 1908g: 287. Lectotype ♂, Burma (BMNH, examined).

Yellow. Vertex with median, white stripe. Pronotum with narrow, median, irregular, lateral spot whitish. Forewing with broad, median, mottled, brown band on apical 0.33.

Head about as wide as pronotum (46:47). Vertex about as long as wide in male (29:28) but longer than its width in female (38:34). Pronotum shorter than both vertex and scutellum. Face with four lateral, oblique ridges and an apical, short, median ridge.

MALE GENITALIA.—Pygofer with lobelike, membranous process, armed with tooth mesally; caudal margin with series of hairlike setae. Male plate with oblique row of stout setae in caudal half, and with marginal, hairlike setae. Preapical lobe of style stout, apophysis relatively slender, apical extension slender. Connective Y-shaped, with stem as long as arm. Aedeagus laterally compressed, membranous for the most part, with pair of slender ventral processes and sclerotized tooth ventral to gonopore, which is elongate; pair of lamellate processes located in apical half of shaft.

MEASUREMENTS.—Male 5.70 mm long, head 1.15 mm wide, pronotum 1.17 mm wide. Female 6.30 mm long, vertex 1.37 mm wide, pronotum 1.42 mm wide.

SPECIMENS EXAMINED.—Lectotype ♂ labeled /Myitta (Doherty)/ /Distant Coll.

1911–383/ /*Kana illaborata* Dist., det. M. Webb, 1980/ here designated (BMNH). Paralectotype ♀ labeled /Tenass. Vall. Myitta (Doherty)/ /Distant Coll. 1911–383/*Nirvana illaborata* Dist. type/ here designated (BMNH).

REMARKS.—This species is very distinctive both in coloration and male genitalic characters and does not appear closely related to other species of *Kana*.

Kana decora (Melichar)

Figs. 80–81

Nirvana decora Melichar 1903b: 166. Holotype ♀, Sri Lanka (ZMHU, examined).

The holotype female is a teneral specimen, and the diagnostic coloration is not very well developed. Melichar (1903b) has given a good description of this species and hence it is not redescribed here.

SPECIMEN EXAMINED.—Holotype ♀, labeled /Type/ /6178/ /Ceylon, nictus/ /*Nirvana/ /decora* m. det. Melichar/ /*Nirvana decora* Melichar/ (ZMHU).

Kana fasciata Pruthi

Kana fasciata Pruthi 1930a: 22. Syntypes ♂, ♀, Sri Lanka (ZSI, not examined).

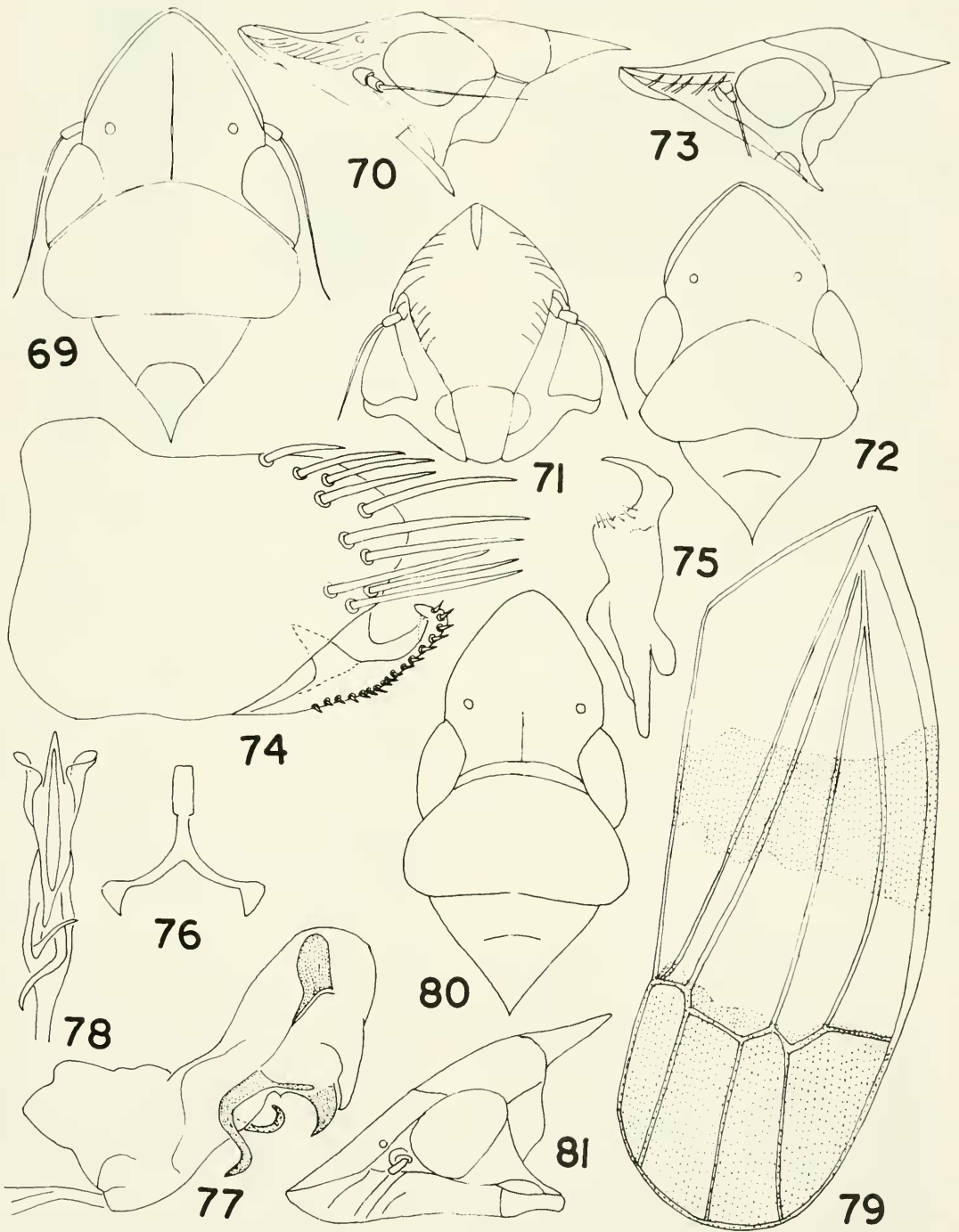
The types of this species were not available for study at the time the senior author visited ZSI. Pruthi's (1930a) description and illustrations suggest this to be a species with very distinctive coloration.

Genus *Chudania* Distant

Chudania Distant 1908g: 268. Type species *Chudania delecta* Distant, by original designation and monotypy.

Yellow, with prominent broad stripe running on head, thorax, and along inner margin of clavus, extending laterally to occupy entire apex of forewing, black.

Vertex either as long as or slightly shorter than width, disc convex without median groove. Anterior area of disc rugose. Ocelli in front of and mesad of eyes. Frontoclypeus convex, with four to six transverse, prominent rugae evanescent medially on dorsal aspect and with median ridge in upper 0.75. Lora prominent. Clypellus large, slightly narrowed apically. Pronotum twice as wide as long, slightly longer than scutellum, polished and transversely, finely rugulose. Forewing with



Figs. 69-81. *Kana illaborata* Distant: 69, head and thorax, male; 70, same, profile; 71, same, face; 72, head and thorax, female; 73, same, profile; 74, male pygofer; 75, style; 76, connective; 77, 78, aedeagus, lateral and caudal views; 79, male forewing. *K. decora* (Melichar): 80, head and thorax; 81, same, profile.

appendix wanting, apical cells four and antepical cells two. Hindwing with four apical cells. Hind tibial spinulation R_1 18 ± 2 , R_2 12 ± 1 , R_3 12 ± 1 .

Male pygofer with rounded, caudal margin, length shorter than height, strongly sclerotized with single, submarginal row of long setae and ventral process. Anal tube stout and large, about 0.8 times as high as height of pygofer. Male plate with uniseriate macrosetae in apical 0.66 and with long, hairlike setae. Style with prominent preapical lobe, apophysis slender, apex avicephaliform. Style rather T-shaped. Aedeagus membranous for most part, bent in midlength, laterally expanded, with ventrally directed, subapical, pronglike, sclerotized processes surrounding gonopore.

REMARKS.—This genus is related to *Kana* and *Afrokana* Heller with which it shares hindwing venation; with *Afrokana* it shares the structure of the male pygofer. However, they differ in the shape of the head. Linnavuori (1979) stated that *Afronirvana* Evans, *Chudania*, and *Afrokana* are very close, sharing, for instance, the same unique genital structure. He believes the recorded differences are too slight for separating them as valid genera. *Afrokana* is closer to *Kana* than to *Chudania* considering the peculiar shape of the aedeagus they share. It is likely that the study of more material of these genera, especially from Malaysia, Indonesia, and the Philippines, may prove that these taxa are congeneric with *Chudania*.

Chudania delecta Distant

Figs. 82–96

Chudania delecta Distant 1908g: 268. Holotype ♀, India (BMNH, examined).

Male. Slender, darker than female. Vertex, pronotum, scutellum, upper part of face at level with lower margins of eyes, chocolate brown. Ocelli white, eyes dark brown. Forewing yellow, with posteriorly widening, black stripe along inner margin, occupying entire apical 0.33 of forewing (Fig. 82); two white, hyaline, triangular areas on costal area near apex and some cross-veins enclosing apical cells paler. Lower half of face, sterna, and legs yellow. Pygofer and fifth to eighth terga blackish.

Female. Similar to male but paler. Black markings of male, chocolate brown. Entire

face, lateral margins of vertex in front of eyes, and pronotum yellow.

MALE GENITALIA.—Pygofer rounded caudally, with submarginal row of macrosetae, ventral process broad caudodorsally with finely serrated, dorsal margin. Male plate more or less of uniform width, caudally rounded, with outer, marginal, long, hairlike setae. Anal tube large, about as long as length of pygofer. Style with anterior part larger than posterior part to the point of articulation with connective. Stem of connective thrice as long as arms, apex expanded. Aedeagus membranous for most part, processes sclerotized, bent about its midlength, apical half robust, preatrium with short ventral and longer lateral processes; two pairs of processes arising where shaft bends, dorsal pair elongate, curved at midlength, the ventral pair shorter, three to five branched.

FEMALE GENITALIA.—Hind margin of seventh sternum straight. Ovipositor exceeding length of pygofer. Distal half of pygofer black.

MEASUREMENTS.—Male 4.62 (4.60–4.70) mm long, head 1.07 mm wide, pronotum 1.11 (1.07–1.12) mm wide. Female 5.38 (5.20–5.40) mm long, head 1.20 mm wide, pronotum 1.22 (1.20–1.25) mm wide.

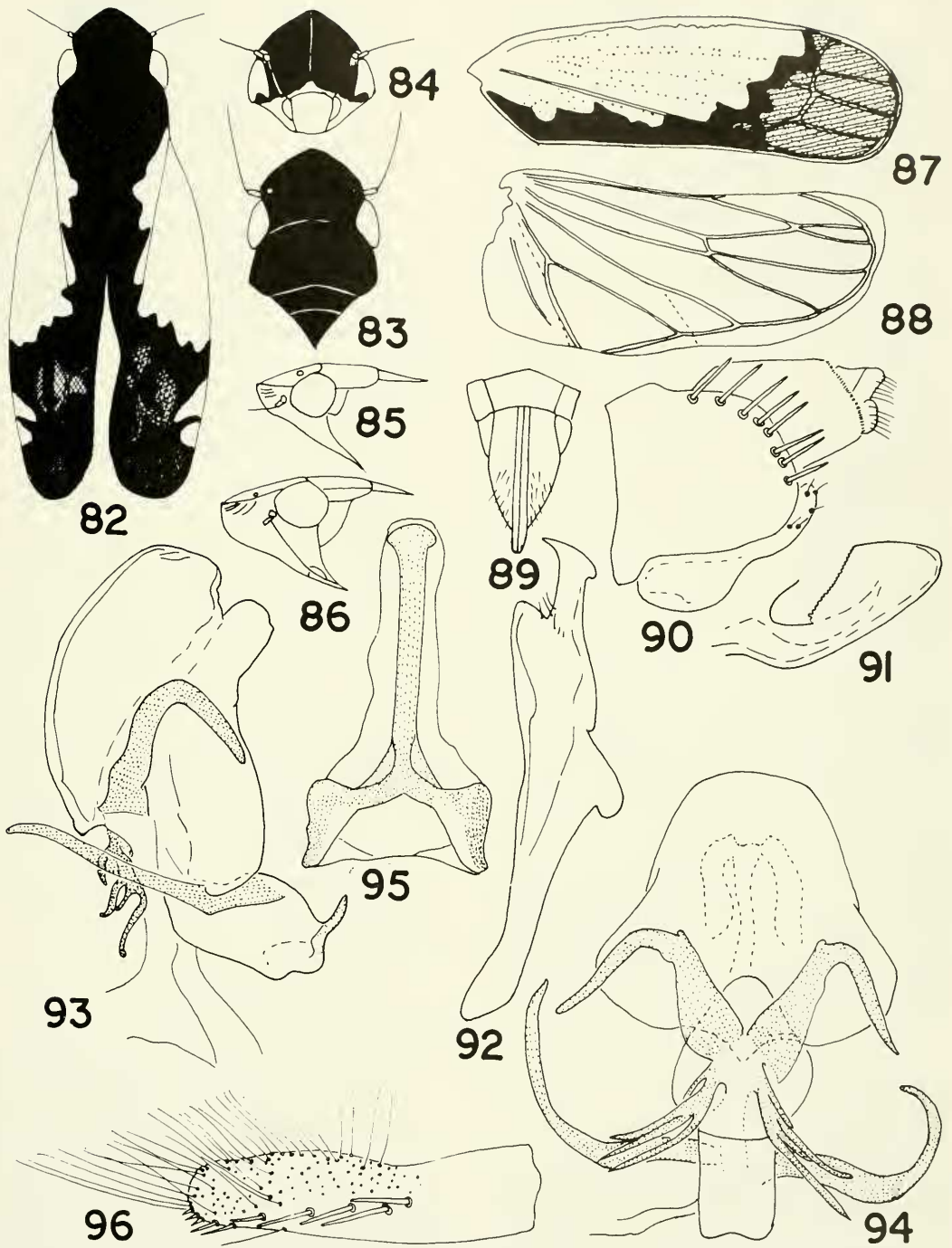
SPECIMENS EXAMINED.—Holotype ♀ labeled /Type, H.T./ /*Chudania delecta* Dist., type/ /Kurseong/ Distant Coll. 1911–383/ (BMNH). India: West Bengal: 8 ♂, 7 ♀, Kurseong, 1,483 m, 22.x.1981, C. A. & S. Viraktamath; 1 ♀, 15 km E Kalimpong, 1,780 m, 27.x.1981, C.A.V.; 4 ♂, 11 ♀, Kalimpong, 1,768 m, 29.x.1981, S.V.; 9 ♂, 19 ♀, 8 km E of Kalimpong, 1,968 m, 29.x.1981, C. A. V. Mizoram: 11 ♂, 11 ♀, Aizawl, 18.xi.1981, C. S. Wesley; 11 ♂, 14 ♀, Lungleh, 20–25.xi. 1981, C.S.W. (UAS).

REMARKS.—*Chudania delecta* and *C. africana* Heller are closely related but differ in coloration, shape of the ventral pygofer process, and the processes on the aedeagus. Also, the dorsal half of the aedeagus is more robust in *C. delecta* than in *C. africana*. The male genitalia of the third species, *C. exposita* Jacobi, is not known.

Genus *Sophonia* Walker

Sophonia Walker 1870b: 327. Type species: *Sophonia rufithum* Walker by monotypy.

Pseudonirvana Baker 1923a: 386. Type species: *Pseudonirvana sandakanensis* Baker, by original designation.



Figs. 82-96. *Chudania delecta* Distant: 82, habitus, male; 83, head and thorax, male; 84, face, male; 85, head and thorax, profile, male; 86, same, female; 87, forewing; 88, hindwing; 89, ovipositor; 90, male pygofer; 91, ventral process of pygofer; 92, style; 93, 94, aedeagus, lateral and dorsal views; 95, connective; 96, male plate.

Quercinirvana Ahmed & Mahmood 1970: 260. Type species: *Quercinirvana longicephala* Ahmed & Mahmood, by original designation. *New synonymy.*

Head as wide as or wider than pronotum. Vertex as long as or longer than width between eyes, anterior half rugulose or granular, disc either flattened or slightly convex. Ocelli lateral in front of eyes. Frontoclypeus depressed, with prominent, lateral ridges and with median, apical ridge; face longer than width including eyes. Forewing with second apical cell narrowed apically. Hindwing with three apical cells. Hind tibial spinulation R_1 20 ± 2 , R_2 12 ± 1 , $R_3 + 1$, R_4 18 ± 2 .

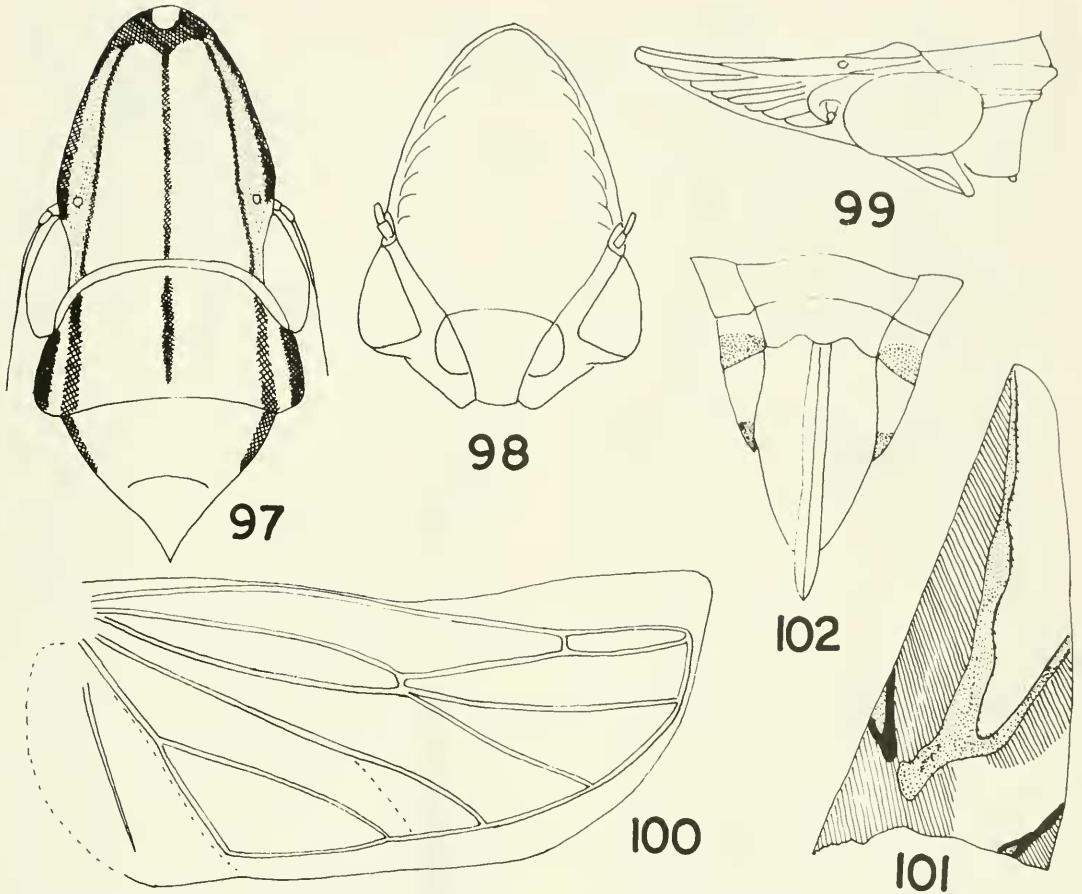
Pygofer rounded or obtusely angled caudally, with or without caudal or ventral process; macrosetae confined to caudal 0.33 area. Anal tube prominent. Male plate broader than in *Nirvana*, three to four times as long as its width and rather parallel-sided with oblique row of stout spines in caudal 0.66 area and hairlike setae. Connective Y-shaped, its stem usually more than 1.5 times as long as each arm. Aedeagus with dorsal apodeme well developed, often with processes; preatrium variable, with or without processes; shaft tubular or lamellate, with or without process.

REMARKS.—Evans (1947a) suppressed *Pseudonirvana* as a junior synonym of *Sophonia*. This genus includes brightly colored species, often with red or orange streaks. It is closely related to *Kana* and *Nirvana*. It can be differentiated mainly by its shorter male plates and complex aedeagus that has processes on the dorsal apodeme and apex of the shaft. The holotype of *Sophonia rufitelum* is a female (Figs. 97–102). The relationships discussed here are based on species assigned to this genus from the Indian subcontinent.

Key to Species of *Sophonia*

- 1. Vertex as long as wide between eyes (Figs. 186, 198) 2
- Vertex longer than wide between eyes (Figs. 112, 208) 3
- 2(1). Male pygofer with long, ventral and short, dorsal process (Fig. 203); preatrium without processes *bifida*, n. sp.
- Male pygofer without processes; preatrium with a pair of processes (Fig. 191) *modesta* (Distant)
- 3(1). Vertex and pronotum with either single or paired, black, longitudinal stripe(s) usually connected to black spot or spots near apex of vertex (Figs. 102, 112, 122) 4

- Vertex and pronotum without black, median stripe or spot near apex; vertex sometimes with median, bright crimson streak (Figs. 164, 177) or orange stripe (Fig. 154) 8
- 4(3). Vertex with two rather oval, contiguous spots, each connected to longitudinal, black line (Figs. 103, 104); aedeagal shaft bifid (Figs. 109, 110) *linealis* (Distant)
- Vertex with a large, round, black spot at apex either connected to or short distance away from one or paired longitudinal line(s) (Figs. 112, 122); aedeagal shaft not bifid 5
- 5(4). Male pygofer without ventral or caudal process (Fig. 125); aedeagus as in Fig. 129; median, black lines on vertex not connected to its apical, round spot (Fig. 122) *longitudinalis* (Distant)
- Male pygofer with ventral or caudal process; aedeagus variable but not as above (Figs. 118, 150); median, black stripe(s) of vertex connected to spot at apex (Figs. 112, 132) 6
- 6(5). Vertex with single, median, black stripe (Fig. 142); male pygofer process short and narrow, apophysis of style hooklike; apex of each arm of dorsal apodeme with two long and short, median processes (Fig. 150) *keralica*, n. sp.
- Vertex with two median, black stripes (Fig. 112); male pygofer process broad and long; apophysis of style beaklike; each arm of dorsal apodeme with a process on caudal margin (Fig. 118) 7
- 7(6). Male pygofer process with serrated, dorsal margin; process of dorsal apodeme exceeding width of shaft; shaft with pair of long, caudally directed processes (Fig. 118) *longicephala* (Ahmed & Mahmood)
- Male pygofer process not serrate apically; process of dorsal apodeme not exceeding width of shaft; processes of shaft short with basal, short, ventral tubercle (Figs. 139, 141) .. *bakeri*, n. sp.
- 8(3). Male pygofer without process; preatrium of aedeagus with process (Figs. 171, 180) 9
- Male pygofer with process (Figs. 159, 214); preatrium of aedeagus without process 10
- 9(8). Preatrium longer than broad in lateral aspect; longer process of dorsal apodeme not divided (Fig. 171); vertex with short, median, crimson streak in apical 0.66 but not reaching apex ... *insignis* (Distant)
- Preatrium broader than long, longer process of dorsal apodeme bifid (Fig. 180); vertex uniformly whitish yellow with median, crimson streak bifid near apex (Fig. 175) . *complexa*, n. sp.
- 10(8). Vertex with median, broad, orange stripe continued on pronotum, anteriorly narrowed; posterior half on pronotum broadened and blackish, scutellum blackish (Figs. 154, 155); pygofer process short, bladellike, and pointed at apex (Fig. 159); aedeagus shaft tubular with apical, ventrally directed, platelike process (Figs. 162, 163) *illuminata* (Distant)



Figs. 97–102. *Sophonia rufitulum* Walker: 97, head and thorax; 98, face; 99, head and thorax, profile; 100, hindwing; 101, basal half of clavus; 102, ovipositor.

— Vertex, pronotum, and scutellum whitish yellow; pygofer process long, slender, and elbowed (Fig. 214); aedeagus not as above (Fig. 218) *complicata*, n. sp.

Sophonia linealis (Distant)

Figs. 103–111

Nirvana linealis Distant 1908g: 282. Holotype ♀, India (BMNH, examined).

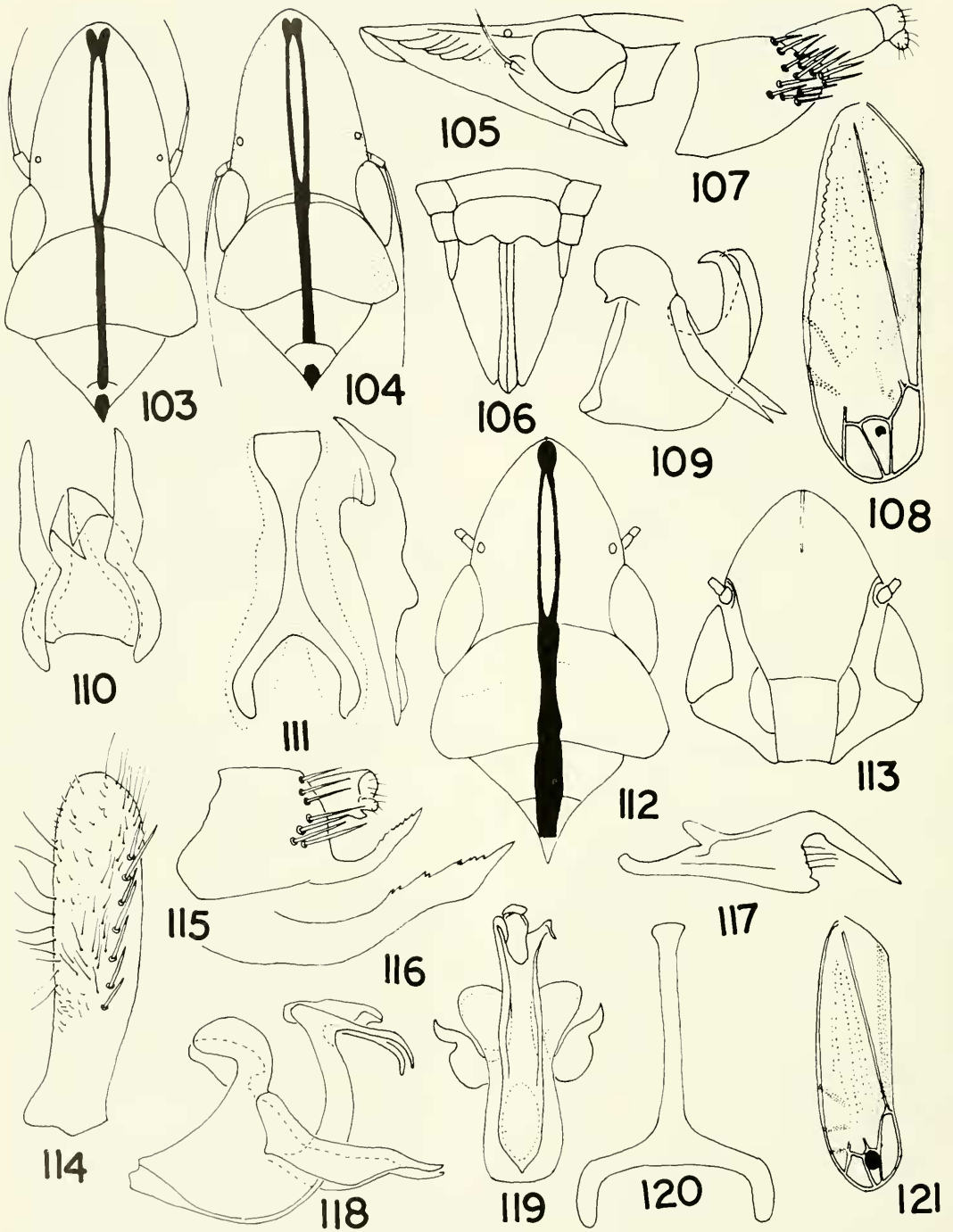
Nirvana greeni Distant 1908g: 283. Holotype ♀, Sri Lanka (BMNH, examined). *New synonymy*.

Yellow. Vertex with two piceous, apical, elongate, fused spots from which longitudinal, piceous lines traverse posteriorly meeting posterior margin of vertex, lateral margin often with orange-yellow stripe confined to ocelli or extending anteriorly. Pronotum and scutellum with median, longitudinal, piceous line often interrupted before apex of scutellum. Claval margin of forewing piceous with piceous stripe bent obliquely near claval apex

and reaching claval suture; spot on second apical cell and two oblique lines from costa in apical half piceous.

Head about as wide as pronotum. Vertex more than 1.5 times as long as wide in male, nearly twice as long as wide in female, lateral margin raised. Scutellum longer than pronotum. Second apical cell of forewing narrowed apically.

MALE GENITALIA.—Pygofer ovate, without ventral process. Plate slightly more than 3.5 times as long as median width, slightly narrowed caudally. Style with broad, preapical lobe and beaklike extension of apophysis relatively short. Stem of connective flared caudally, about twice as long as each arm. Dorsal apodeme of aedeagus robust, each arm with caudally directed, elongate process that exceeds width of shaft; shaft tubular, curved, hooked apically where it appears bifid.



Figs. 103–121. *Sophonia linealis* (Distant): 103, head and thorax of holotype female *Nirvana greeni* Dist.; 104, head and thorax of holotype of *Nirvana linealis* Dist.; 105, profile; 106, ovipositor; 107, male pygofer; 108, forewing; 109, 110, aedeagus, lateral and dorsal views; 111, connective and style. *S. longicephala* (Ahmed & Mahmood): 112, head and thorax; 113, face; 114, male plate; 115, male pygofer; 116, ventral process of pygofer; 117, style; 118, 119, aedeagus, lateral and caudal views; 120, connective; 121, forewing.

FEMALE GENITALIA.—Hind margin of seventh sternum straight with median protuberance.

MEASUREMENTS.—Male 4.06 (4.00–4.10) mm long, head 0.83 (0.80–0.85) mm wide, pronotum 0.88 (0.85–0.93) mm wide. Female 4.82 (4.50–5.00) mm long, head 0.93 (0.88–0.95) mm wide, pronotum 0.98 (0.93–1.03) mm wide.

SPECIMENS EXAMINED.—Holotype ♀, labeled /Type, H.T./Peradeniya, 2.08, Ceylon/ /Distant Coll. 1911–383/ /*Nirvana greeni* Dist., type/ (BMNH). Holotype ♀, labeled /Type, H.T./Calcutta, 6.6.07/ /Distant Coll. 1911–383/ /*Nirvana linealis* Dist., type/ (BMNH). India: Karnataka: 6 ♀, Dharwar, 26.iii.1972; 1 ♀ 29.iv.1969; 1 ♀, —.i.1970; 1 ♀, 14.iv.1972; 1 ♀, —.x.1979 C. A. Viraktamath Coll.; 3 ♂, 3 ♀, Chamarajanagar, 12.viii.1977; 4 ♀, Hunsur, 16.i.1978; 1 ♀, Bangalore, 11.vi.1977; 1 ♀, Arsikere, 23.vii.1978; 1 ♂, 1 ♀, 16.i.1979; 1 ♀, Sulikere, 30.xii.1976, all collected by C. A. Viraktamath (UAS). Kerala: 3 ♂, 6 ♀, Kayangulum, —.viii.1983, ex coconut (UAS).

REMARKS.—The holotypes of *linealis* and *greeni* show color differences, especially the extension of the median, dark fuscous stripe of the pronotum along the inner margin of the clavus in *greeni*, which is absent in *linealis*. The female seventh sterna are identical; hence the species are considered as synonyms. This species is unique among *Sophonia* in having a bifid aedeagal shaft.

Sophonia longicephala
(Ahmed & Mahmood), n. comb.
Figs. 112–121

Quercinirvana longicephala Ahmed & Mahmood 1970: 263. Holotype ♂, Pakistan (University of Karachi, not examined).

Pale yellow, elongate, black spot near apex of vertex contiguous with two longitudinal, black lines that fuse at base of vertex and continue as single line to near tip of scutellum. Forewing with broad, brown stripe along claval commissure reaching claval apex and obliquely crossing corium, apical margin suffused with brown, costal margin with anterior, oblique and two posterior, transverse, black fasciae; second apical cell with black spot.

Head nearly as wide as pronotum. Vertex about 0.33 times longer than wide, disc de-

pressed, faintly granulose. Second apical cell narrowed caudally.

MALE GENITALIA.—Pygofer trapezoidal, with long, caudally directed ventral process dorsally serrated. Plate about four times as long as wide, distal 0.66 with a single row of macrosetae and hairlike setae. Style with large, preapical lobe, beaklike extension of apophysis long. Aedeagus with dorsal apodeme well-developed, caudally directed, apically pointed processes that exceed width of shaft, shaft tubular, dorsoanteriorly curved with subapical, caudally directed, slender, elongate processes.

MEASUREMENTS.—Male 4.50 (4.30–4.70) mm long, head 0.91 (0.90–0.93) mm wide, pronotum 0.96 (0.93–1.00) mm wide.

SPECIMENS EXAMINED.—India: Haryana: 1 ♂, Kalka, 29.i.1979, C. A. Viraktamath; Himachal Pradesh: 1 ♂, Kulu, 1.iv.1978, I. Dworakowska (UAS).

REMARKS.—This species is related to and resembles externally *S. bakeri*. The spot on the vertex in this species is rather oval (as in *bakeri*), and it differs in the details of the male pygofer process and the aedeagus.

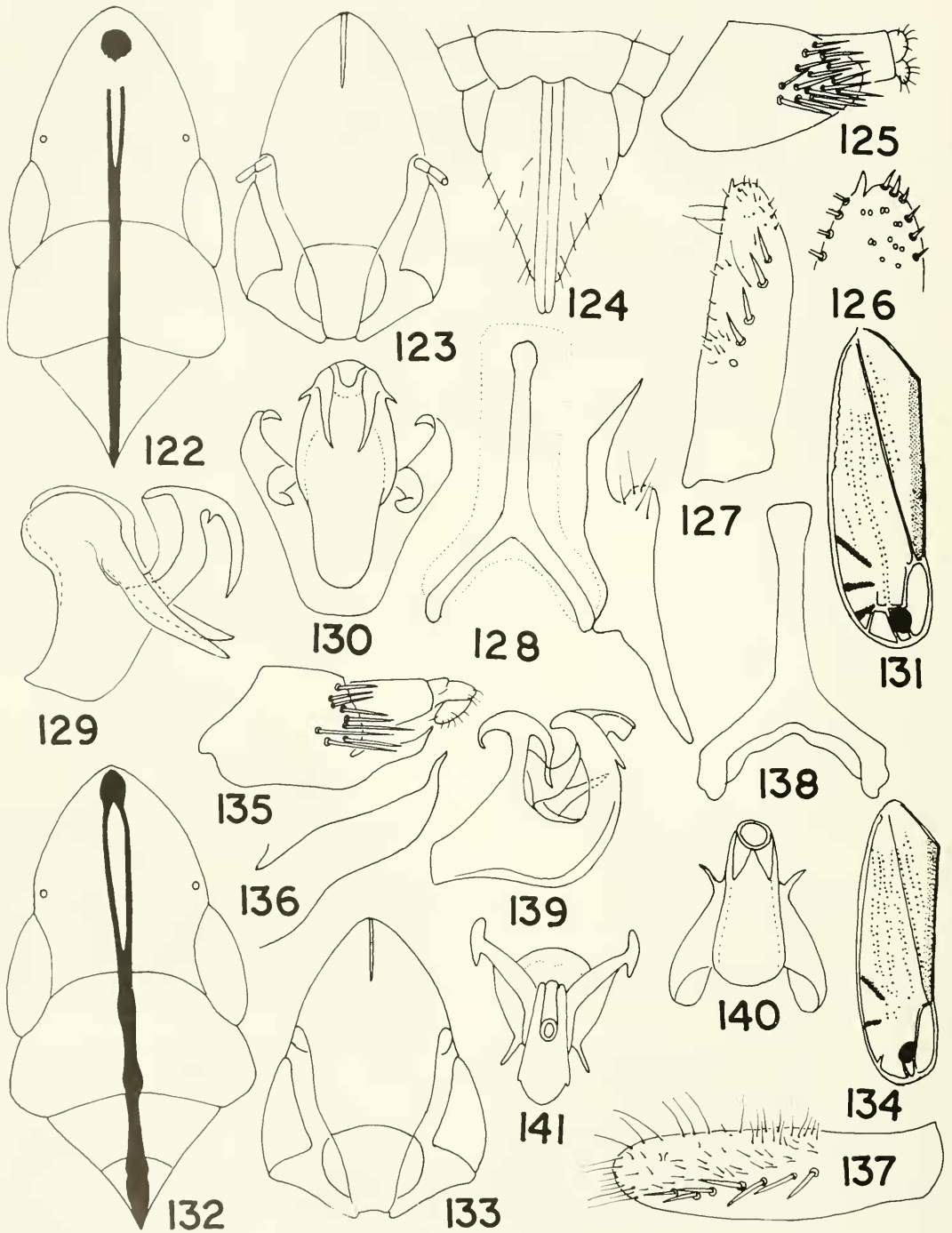
Sophonia longitudinalis (Distant)
Figs. 122–131

Nirvana longitudinalis Distant 1908g: 283. Lectotype ♀, Burma (BMNH, examined).

Vertex pale yellow with large, subapical, black spot and two median, longitudinal lines, not reaching black spot and fused near hind margin of vertex, continued on pronotum and scutellum as median stripe and on clavus as irregular stripe. Forewing with large, round, black spot in second apical cell extending partly to first apical cell, apical margin suffused with brown.

Head as wide as pronotum or slightly narrower. Vertex about 1.5 times as long as wide, apex subangular, disc mildly convex, granulose. Second apical cell narrowed caudally.

MALE GENITALIA.—Pygofer ovate, ventral process wanting, macrosetae limited to distal 0.33. Plate about 3.5 times as long as width, with short tooth at the outer apical margin. Style with short, preapical lobe, apophysis with long, beaklike extension. Aedeagus with robust, dorsal apodeme, each of its arms bearing an elongate, caudally directed process, preatrium wanting, shaft lamellate with lateral margin caudally curved, widest at apical



Figs. 122-141. *Sophonia longitudinalis* (Distant): 122, head and thorax; 123, face; 124, ovipositor; 125, male pygofer; 126, 127, male plate; 128, connective and style; 129, 130, aedeagus, lateral and caudal views; 131, forewing. *S. bakeri*, n. sp.: 132, head and thorax; 133, face; 134, forewing; 135, male pygofer; 136, pygofer process; 137, male plate; 138, connective; 139-141, aedeagus, lateral, caudal, and dorsal views.

half with long, slender, arcuate, apically pointed, ventrally curved process that bears a short tooth on its outer margin at base.

FEMALE GENITALIA.—Hind margin of seventh sternum slightly concave. Ovipositor slightly exceeding pygofer.

MEASUREMENTS.—Male 4.43 (3.80–5.40) mm long, head 0.96 (0.80–1.43) mm wide, pronotum 0.96 (0.85–1.13) mm wide. Female 4.90 (4.60–5.30) mm long, head 1.02 (0.98–1.10) mm wide, pronotum 1.05 (1.00–1.10) mm wide.

SPECIMENS EXAMINED.—Lectotype ♀ labeled /Myitta (Doherty)/ /Distant Coll. 1911–383/ /*Nirvana longitudinalis* Dist., type/ here designated (BMNH). India: Karnataka: 6 ♂, Mudigere, 4–6.iv.1980, C. A. Viraktamath; 1 ♀, 7.iv.1975, C.A.V.; 1 ♀, Kodlipet, 6.iv.1975; 1 ♂, Hunsur, 10.i.1978; 1 ♀, Bannerghatta, 12.ix.1976, B. Mallik; Kerala: 1 ♀, Thekkadi, 27.iii.1977, C.A.V. Nepal: Nagarkot, 1 ♂, 1 ♀, 15.ix.1979; I. Dworakowska (UAS). Burma: 1 ♀, Amberst Dist., Kawkareik, 19–20.xi.1911, F.H.G. (ZSI).

REMARKS.—This species can be distinguished from all other species of *Sophonia* by its lamellate aedeagal shaft and tooth on the apex of the male plate.

Sophonia bakeri, n. sp.
Figs. 132–141

Pale yellow to whitish yellow. Vertex with black spot near apex, joined by two black, longitudinal lines that fuse basally and extend to scutellum. Pronotum and scutellum sometimes with reddish spots, scutellum in male entirely reddish. Forewing with brown stripe close to or along anal margin, marked with yellow along inner margin, apex of clavus and apical margin brown, costal margin with anterior, oblique and posterior, transverse, brown fasciae, second apical cell with large, black spot.

Vertex about 1.5 times as long as wide, apex subtriangular, disc depressed. Posterior half of pronotum transversely rugulose. Second apical cell narrowed at apex.

MALE GENITALIA.—Pygofer with ventrocaudal angle produced to process with attenuated apex. Plate 3.5 times as long as wide. Apophysis of style with long, beaklike extension. Stem of connective 1.5 times as long as each arm. Aedeagus with each arm of dorsal apo-

deme robust, bearing triangular process on caudal margin; preatrium short; shaft tubular, caudodorsally curved, apex strongly incurved with ventrally directed, short, pronglike process on caudal margin subapically.

FEMALE GENITALIA.—Hind margin of seventh sternum concavely emarginate. Ovipositor exceeding length of pygofer.

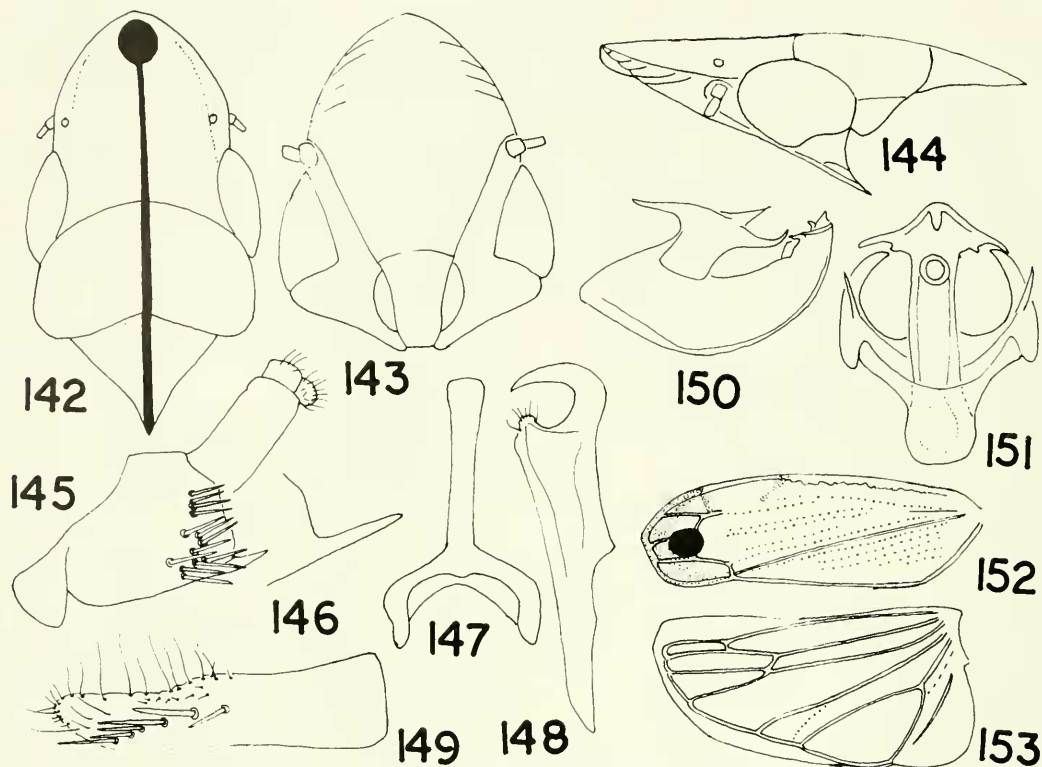
MEASUREMENTS.—Male 4.48 (4.30–5.00) mm long, head 0.90 (0.85–1.00) mm wide, pronotum 0.88 (0.78–1.03) mm wide. Female 5.08 (4.70–5.30) mm long, head 1.04 (0.93–1.23) mm wide, pronotum 1.05 (1.00–1.10) mm wide.

SPECIMENS EXAMINED.—Holotype ♂, India: Karnataka: Mudigere, at light, 4–6.iv.1980, C. A. Viraktamath (UAS). Paratypes: India: Karnataka: 2 ♂, Dharwar, —.i.1970, C. A. Viraktamath; 1 ♀, Kodlipet, 6.iv.1975, C.A.V.; 1 ♀, Bangalore, 9.iii.1975, C.A.V.; 1 ♀, Kalhalla, 18.i.1978, C.A.V., 1 ♀, Mudigere, 23.ix.1973, C.A.V.; 1 ♂, 1 ♀, Kemmanagundi, 8.iv.1975, K. D. Ghorpade; Kerala: 1 ♂, Thekkadi, 27.iii.1977, S. Viraktamath; Maharashtra: 1 ♀, Matheran, 915 m, 23.xi.1977, C.A.V.; Tamil Nadu: 1 ♂, Kodaikanal, 2,250 m, 10.vi.1980, C. S. Wesley; Uttar Pradesh: 1 ♂, 1 ♀, Dehra Dun, 28.iv.1975, C.A.V.; Nepal: 2 ♀, Gokarna, 14.ix.1979, I. Dworakowska; 1 ♀, Sarankot, 17.ix.1979, ex *Quercus* sp., I.D. (1 ♂ and 1 ♀ in BMNH, IARI, USNM, and rest in UAS).

REMARKS.—*Sophonia bakeri* is related to *S. longitudinalis* and *S. longicephala* as they share similar external coloration and male genitalia. They form a closely knit group. *S. bakeri* differs from the other two by its shorter process of the dorsal apodeme and aedeagal process.

Sophonia keralica, n. sp.
Figs. 142–153

Uniformly yellow. Vertex with round, black spot near apex connected by single, median, longitudinal, black line, discontinuous for short distance near black spot and then continued to apex of scutellum. Lateral margin of vertex orange basally. Forewing with claval suture and punctures along cubital vein brown, second and part of third apical cells occupied by large, black spot; costal margin with anterior, oblique and posterior, transverse, black fasciae, apex of clavus and apical margin brownish.



Figs. 142-153. *Sophonia keralica*, n. sp.: 142, head and thorax; 143, face; 144, head and thorax, profile; 145, male pygofer; 146, pygofer process; 147, connective; 148, style; 149, male plate; 150, 151, aedeagus, lateral and cephalic views; 152, forewing; 153, hindwing.

Head nearly as wide as pronotum. Vertex slightly longer than wide, disc flat, depressed near apex. Scutellum slightly longer than pronotum. Second apical cell of forewing narrowed slightly near apex.

MALE GENITALIA.—Pygofer caudally rounded, its ventrocaudal angle produced to sharp, thin process, five macrosetae along caudal margin in straight line, black, rest hyaline. Anal tube as long as pygofer. Plate four times as long as wide. Style with strongly hooked apophysis. Stem of connective 1.5 times as long as each arm. Dorsal apodeme of aedeagus slender, each arm with ventral, dorsal, and short, median process; shaft tubular with pair of laterally directed processes, gonopore subapical.

MEASUREMENTS.—Male 3.90 mm long, head 0.90 mm wide, pronotum 0.93 mm wide.

SPECIMEN EXAMINED.—Holotype ♂, India: Kerala: Thekkadi, 27.iii.1977, S. Viraktamath Coll. (UAS).

REMARKS.—*Sophonia keralica* is related to *S. illuminata*. Both have similar male genitalia. They differ, however, in coloration and detailed structure of the aedeagus.

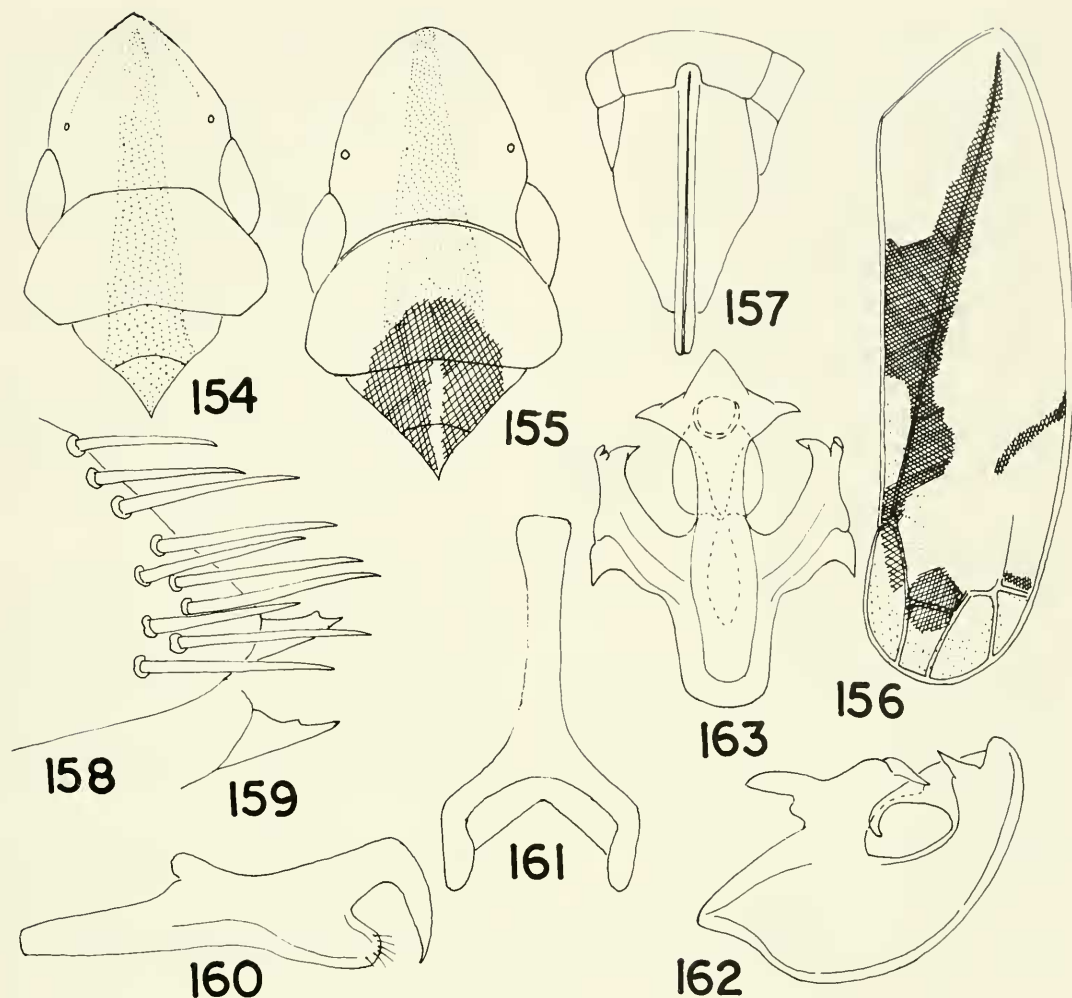
Sophonia illuminata (Distant), n. comb.

Figs. 154-163

Kana illuminata Distant 1918b: 35. Lectotype ♂, India (BMNH, examined).

Kana signata Distant 1918b: 34. Lectotype ♀, India (BMNH, examined). *New synonymy*.

Female. Vertex and pronotum creamy white with yellowish lateral areas, median stripe narrowing to apex of vertex sanguineous on vertex and anterior half of pronotum, widened in posterior half where it is black. Scutellum black except for two lateral, basal spots. Clavus along claval suture and apical half piceous except for subapical, elongate, orange spot. Corium along its inner margin piceous which widens near apex of clavus and changes to orange; appendix fuscous, two large, round spots in second apical cell,



Figs. 154–163. *Sophonia illuminata* (Distant): 154, head and thorax of lectotype male *Kana illuminata*; 155, head and thorax of lectotype female *Kana signata* Distant; 156, forewing, female; 157, ovipositor; 158, apex of male pygofer; 159, pygofer process; 160, style; 161, connective; 162, 163, aedeagus, lateral and caudal views.

oblique line at apical 0.33 of costa and more distal, transverse band piceous, rest of wing yellow and areas anterior to piceous spots whitish.

Male. Coloration less extensive compared to female. Stripe on vertex continuing on pronotum and scutellum, gradually widening and sanguineous throughout. Forewing coloration comparatively less developed.

Head narrower than pronotum, median length of vertex slightly longer than width between eyes. Face longer than wide.

MALE GENITALIA.—Pygofer lobe gradually narrowed caudally and terminated by sharp, triangular process and with series of stout,

long spines. Plate parallel-sided, with six stout setae in oblique row commencing at midlength, third to fifth setae black in color. Style with stout, preapical lobe and hooklike, rather slender apophysis with attenuated apex. Connective with stem 1.5 times as long as each arm. Aedeagus with short, dorsal pair of blunt processes and ventral, fingerlike process; shaft robust at base, narrowed apically with dorsal, large gonopore surrounded by two lateral, pronglike processes and ventrally directed, lobelike plate.

FEMALE GENITALIA.—Hind margin of seventh sternum concave. Ovipositor exceeding length of pygofer.

MEASUREMENTS.—Male 4.40 mm long, head 1.00 mm wide, pronotum 1.05 mm wide. Female 5.1 mm long, head 1.12 mm wide, pronotum 1.12 mm wide.

SPECIMENS EXAMINED.—3 syntype ♂ of *Kana illuminata* mounted on single card labeled /S. India, Madras, Kodaikanal, T. V. Campbell, K.K.4.16/. One of these was removed, remounted, and relabeled by the senior author, /Kodaikanal, S. India, T. V. Campbell/ and is here designated as lectotype; others designated paralectotypes. One paralectotype ♂ labeled /Kodaikanal, India, T. V. Campbell/ /S. India, E. A. Butler, 1915-60/ /*Kana illuminata* Dist., type/ (BMNH). Lectotype ♀ labeled /Kodaikanal, S. India, T. V. Campbell, K. K.5.11/ /S. India, E. A. Butler, 1915-60/ /54,9/ /*Kana signata* Dist., type/ here designated (BMNH). India: Tamil Nadu: 1 ♀, Trichinopoly, J. Dubrenil (IRSNB); 1 ♀ Kodaikanal, 2,030-2,150 m, —.viii.1922, S. Kemp (ZSI).

REMARKS.—*Sophonia illuminata* and *S. signata* are the male and female, respectively, of the same species based on the similarity in external coloration and structure. This species is closely related to *S. keralica*. Both have a similar type of male genitalia but differ in coloration and structure of the pygofer process and aedeagus.

Sophonia insignis (Distant), n. comb.

Figs. 164-174

Nirvana insignis Distant 1918b: 33. Lectotype ♂, India (BMNH, examined).

Whitish yellow. Median groove on vertex crimson from about center to just short of apex, lateral marginal area orange. Forewing hyaline, light brown stripe along anal margin rarely reaching apex of clavus, if so occupying entire quarter of clavus, or stripe wanting, apex of clavus brown; costal margin with two long, oblique fasciae, third transverse and fourth short, broad, oblique fasciae in the distal half brown; apical margin brown; second apical cell with black spot.

Head narrower than pronotum. Vertex about 1.5 times as long as wide between eyes; disc flat or slightly depressed toward base, apex granulose. Second apical cell of forewing slightly narrowed distally.

MALE GENITALIA.—Caudal lobe of pygofer rounded, without processes. Plate about 3.5 times as long as wide. Preapical lobe of style

robust, apophysis slender, with apical extension forming short, beaklike extension. Aedeagus with preatrium well developed, with ventrocaudally directed process, about as long as preatrium; dorsal apodeme broad, platelike, with two processes (one short, pronglike on cephalic margin, other long, slender, and inwardly curved in middle) and ventral, short process; shaft tubular, curved anteriorly then ventrally near apex.

FEMALE GENITALIA.—Hind margin of seventh sternum straight. Ovipositor slightly extending beyond pygofer.

MEASUREMENTS.—Male 5.00 (4.80-5.20) mm long, head 0.97 (0.93-1.00) mm wide, pronotum 1.04 (1.03-1.07) mm wide. Female 5.62 (5.00-6.10) mm long, head 1.06 (0.98-1.13) mm wide, pronotum 1.14 (1.03-1.23) mm wide.

SPECIMENS EXAMINED.—Lectotype ♂ labeled /Tenmalai, W. Ghat (W. side). Travancore, 22.xi.08, Annandale/ /Distant Coll. 1911-383/ here designated (BMNH). Paralectotype ♀, with same data as in holotype, here designated (ZSI). India: Kerala: 11 ♂, 6 ♀, Thekkadi, 26-27.iii.1977, C. A. Viraktamath, S. Viraktamath, and B. Mallik Coll.; Karnataka: 2 ♀, Mudigere, 7.iv.1980, C.A.V. (UAS).

REMARKS.—This species is closely related to *S. complexa* and can be differentiated by the structure of male genitalia and coloration.

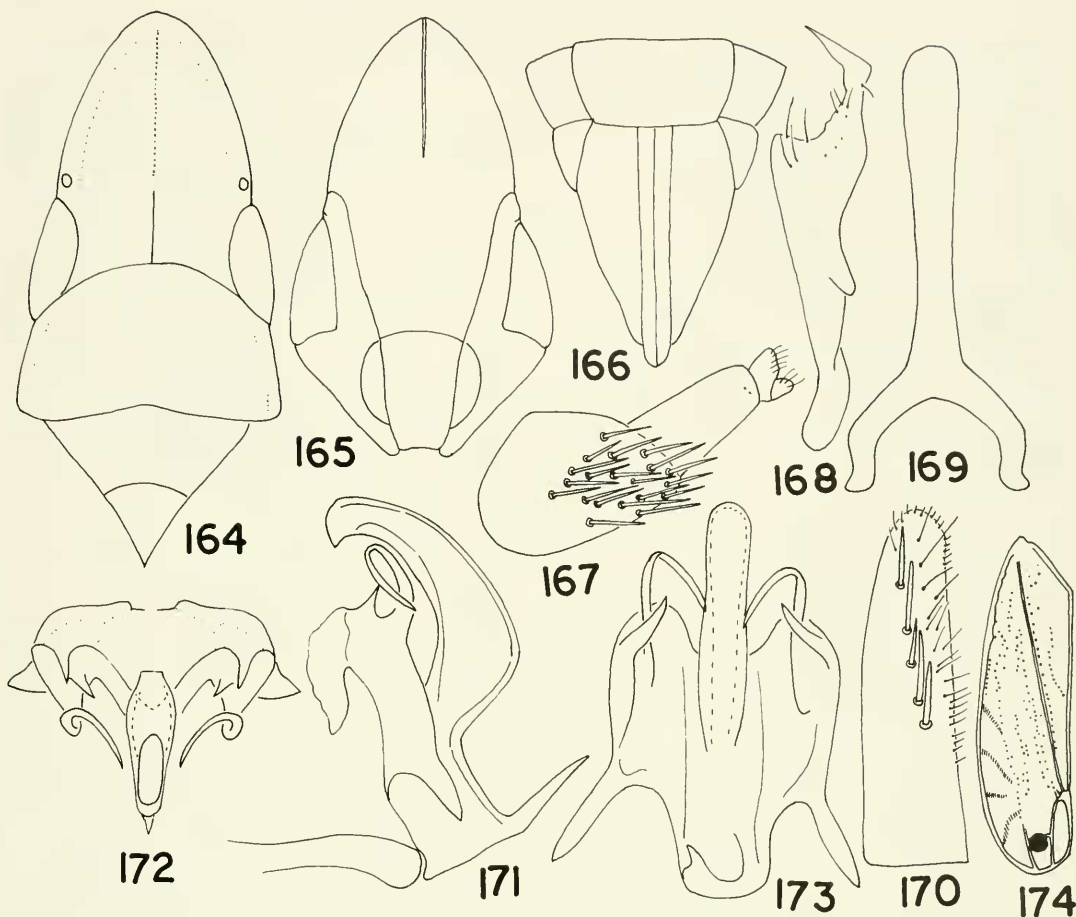
Sophonia complexa, n. sp.

Figs. 175-185

Similar to *S. insignis* but more elongate. Vertex with median, crimson-colored line occupying about 0.66 area and apically bifid, short, slightly oblique, sublateral stripe on apical half of vertex orange. Forewing with fuscous spots (Fig. 178).

Apical 0.75 of vertex elongately rugulose, disc flat, margined by carina.

MALE GENITALIA.—Pygofer elongate, heavily setose, caudally rounded. Anal tube stout, long. Plate parallel-sided, about 3.5 times as long as wide, macrosetae restricted to apical 0.66. Apophysis of style short, apex avicephaliform. Connective with stem about three times as long as each arm. Aedeagus complex, each arm of dorsal apodeme with pair of ventrally directed processes, preatrium with caudally directed process, shaft tubular, slightly curved dorsally near apical 0.33, slightly flared.



Figs. 164–174. *Sophonia insignis* (Distant): 164, head and thorax; 165, face; 166, ovipositor; 167, male pygofer; 168, style; 169, connective; 170, male plate; 171–173, aedeagus, lateral, cephalic, and caudal views; 174, forewing.

FEMALE GENITALIA.—Hind margin of seventh sternum slightly concave.

MEASUREMENTS.—Male 5.32 (5.20–5.50) mm long, head 1.00 (0.97–1.02) mm wide, pronotum 1.06 (1.05–1.07) mm wide. Female 5.92 (5.80–6.00) mm long, head 1.10 (1.05–1.12) mm wide, pronotum 1.16 (1.15–1.17) mm wide.

SPECIMENS EXAMINED.—Holotype ♂, India: Meghalaya: Nongpoh, 762 m, 4.xi.1981, C. A. Viraktamath (UAS). Paratypes: 13 ♂, 4 ♀, data as in holotype but 7 ♂, 2 ♀ S. Viraktamath Coll. (1 ♂ and 1 ♀ in BMNH, IARI, USNM, and rest in UAS).

REMARKS.—This species is related to and resembles *S. insignis* as they share coloration and similar aedeagi. However, *S. complexa* differs from *S. insignis* in having the process of the dorsal apodeme bifid ventrally, a longer

stem on the connective, and the crimson line of the vertex being forked apically.

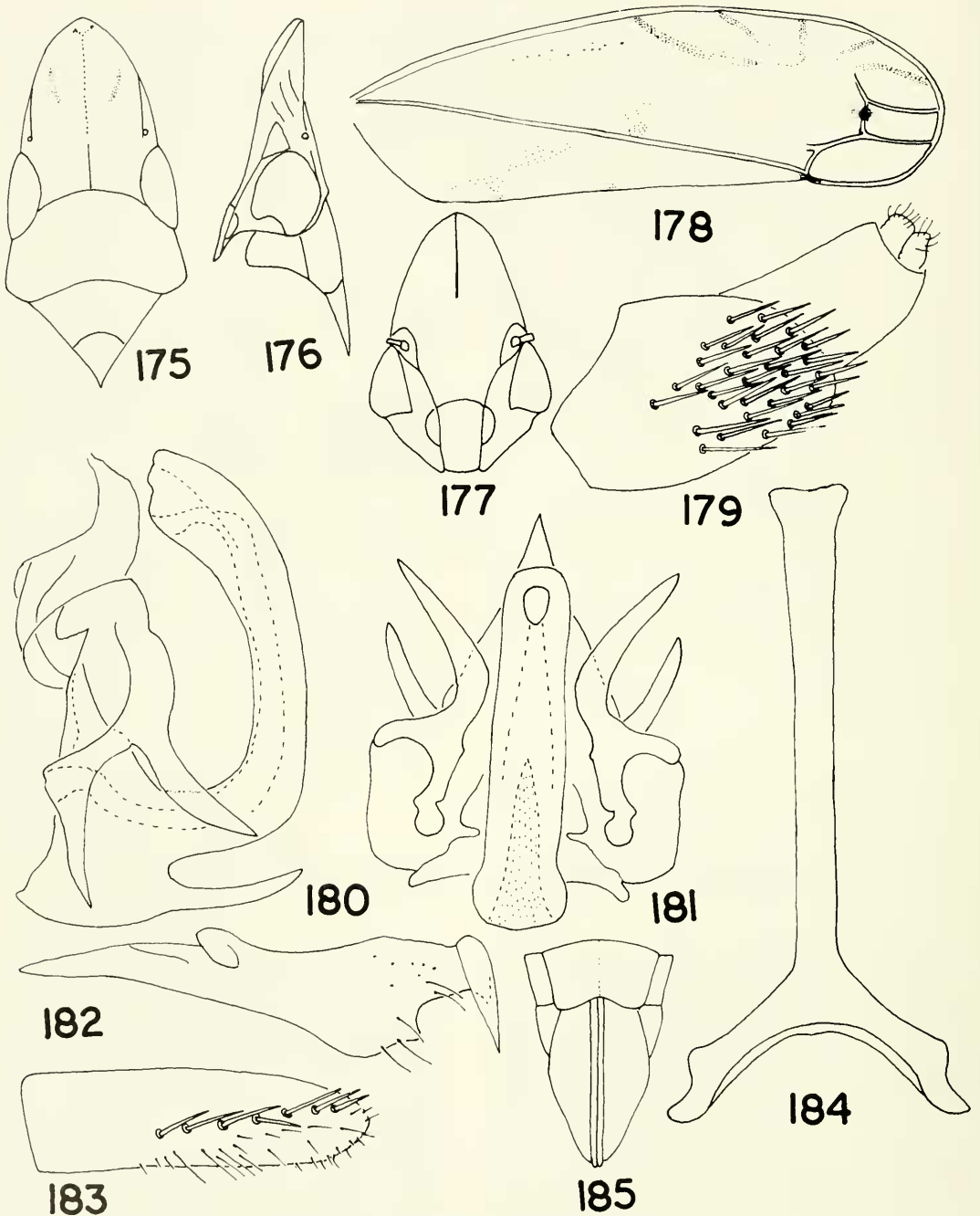
Sophonia modesta (Distant), n. comb.

Figs. 186–197

Kana modesta Distant 1918b: 36. Lectotype ♂, India (BMNH, examined).

Pale yellow. Vertex of female creamy white, eyes lemon yellow. Forewing hyaline with brown stripe close to anal margin often reaching claval apex, apex of corium lemon yellow; costal margin with an anterior, long, oblique, median and a slightly oblique, posterior, transverse, brown fasciae; second apical cell with black spot, apical margin brownish.

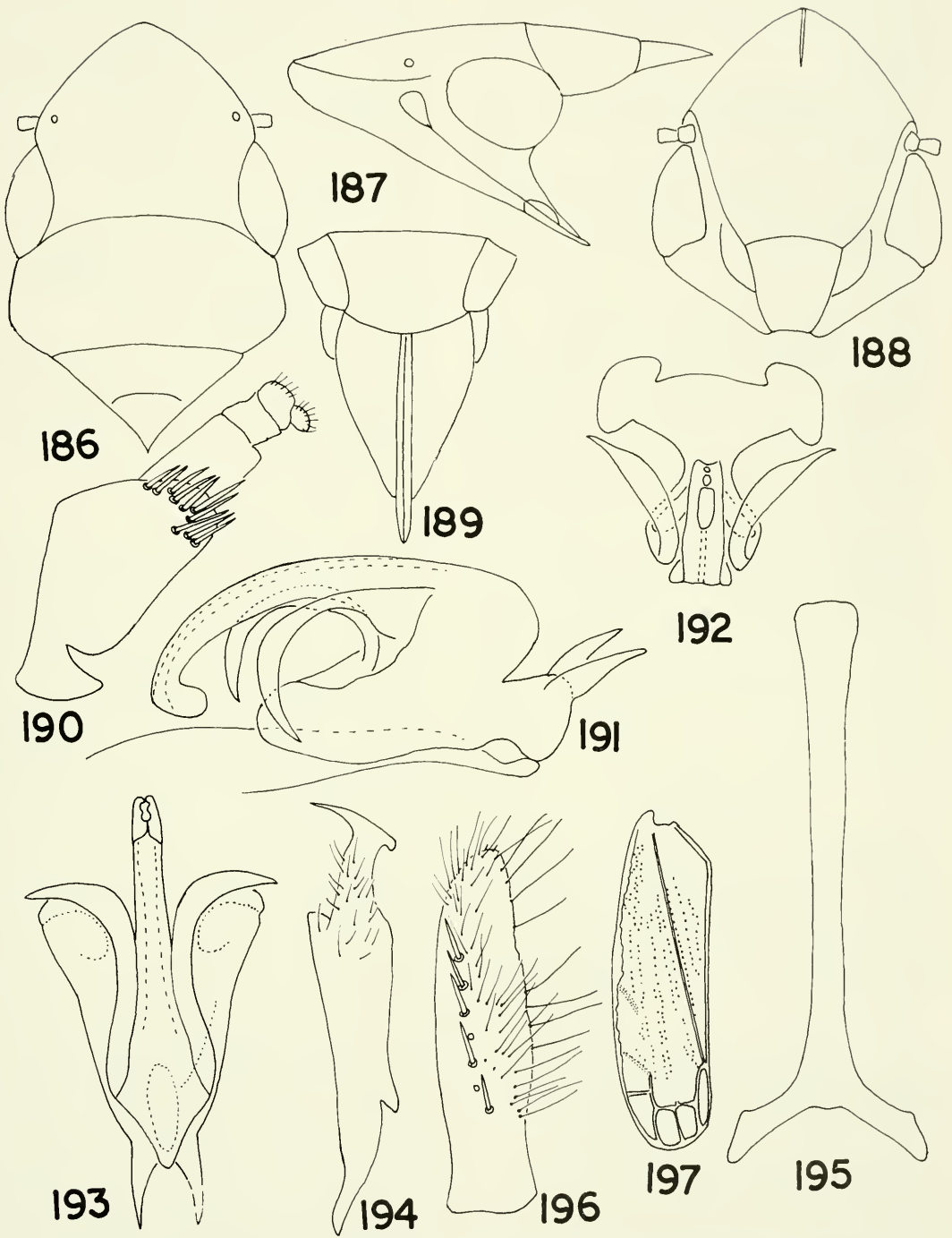
Head slightly broader than pronotum. Vertex as long as wide between eyes, disc convex, apex subangular, granulose.



Figs. 175-185. *Sophonia complexa*, n. sp.: 175, head and thorax; 176, same, profile; 177, face; 178, forewing; 179, pygofer; 180, 181, aedeagus, lateral and caudal views; 182, style; 183, male plate; 184, connective; 185, ovipositor.

MALE GENITALIA.—Caudal lobe of pygofer rounded, without process. Anal collar well developed. Plate four times as long as wide. Preapical lobe of style small, rounded, apophysis setose on lateral margin, apical extension

beaklike. Stem of connective four times as long as each arm. Aedeagus with preatrium short, pair of ventrocaudally directed processes, dorsal apodeme robust, each arm rounded; shaft tubular, slender, dorsally



Figs. 186–197. *Sophonia modesta* (Distant): 186, head and thorax; 187, same, profile; 188, face; 189, ovipositor; 190, pygofer; 191, aedeagus and part of connective, lateral view; 192, 193, aedeagus, dorsal and cephalic views; 194, style; 195, connective; 196, male plate; 197, forewing.

strongly curved anteriorly, apex ventrally directed with pair of elongate, basal processes that are directed dorsoanteriorly then laterally.

FEMALE GENITALIA.—Hind margin of seventh sternum slightly convex. Ovipositor fairly exceeding pygofer.

MEASUREMENTS.—Male 4.43 (4.40–4.50) mm long, head 1.08 (1.07–1.10) mm wide, pronotum 1.05 (1.03–1.08) mm wide. Female 5.20 (5.00–5.40) mm long, 1.24 (1.20–1.28) mm wide, pronotum 1.19 (1.15–1.25) mm wide.

SPECIMENS EXAMINED.—Lectotype ♂ labeled /South India, Madras, Coonoor, T. V. Campbell/ here designated (BMNH). India: Tamil Nadu: 3 ♂, 1 ♀, Kotagiri, 23.x.1975, C. A. Viraktamath; 1 ♀, Coonoor, 11.viii.1979, S. Viraktamath; 1 ♂, Wellington, 12.viii.1979, S.V.; 5 ♀, Ootacamund, 2,350 m, 13.viii.1979, S.V. (UAS).

REMARKS.—*Sophonia modesta* externally resembles *S. bifida* in having a wider vertex, but they are only distantly related. It is related to *S. insignis* and *S. complexa* and differs from them in having paired preatrial processes and lacking processes on the dorsal apodeme. In these three species the stem of the connective is more than three times as long as each arm.

Sophonia bifida, n. sp.

Figs. 198–207

Bright lemon yellow. Two spots on inner claval margin, one at midlength, another at apex, small costal patch about midlength, an outer, oblique and posterior, transverse fascia on costal area fuscous, large, round spot on second apical cell black. Hind tibial apical pecten black.

Head slightly narrower than pronotum. Disc of vertex about as long as wide between eyes, broadly rounded with apical area finely rugulose, posterior half polished. Frontoclypeus rather tumid. Second apical cell of forewing slightly narrowed caudally.

MALE GENITALIA.—Caudal margin of pygofer rounded with caudodorsal, short, stout, strongly hooked process and caudoventral, elongate, sharply pointed process; macrosetae forming single row. Anal tube large. Preapical lobe of style short, rounded, apophysis slender, rather hooked, apex beak-like. Arms of connective about as long as

stem. Aedeagus with elongate preatrium; each arm of dorsal apodeme rounded; shaft tubular with basal pair of elongate processes extending to about 0.75 of length and with subapical pair of denticles on caudal margin.

MEASUREMENTS.—Male 4.50 mm long, head 1.07 mm wide, pronotum 1.10 mm wide. Female 5.30 mm long, head 1.25 mm wide, pronotum 1.25 mm wide.

SPECIMENS EXAMINED.—Holotype ♂, India: West Bengal: Darjeeling, 2,176 m, 11.xi.1981, C. S. Wesley (UAS). Paratype ♀, India: West Bengal: Kalimpong, 1,370 m, 29.x.1981, S. Viraktamath (UAS).

REMARKS.—Although the shape of the head is similar to that in *S. modesta*, *S. bifida* occupies an isolated place in *Sophonia*. The peculiar pygofer process and aedeagus differentiate it from all other species.

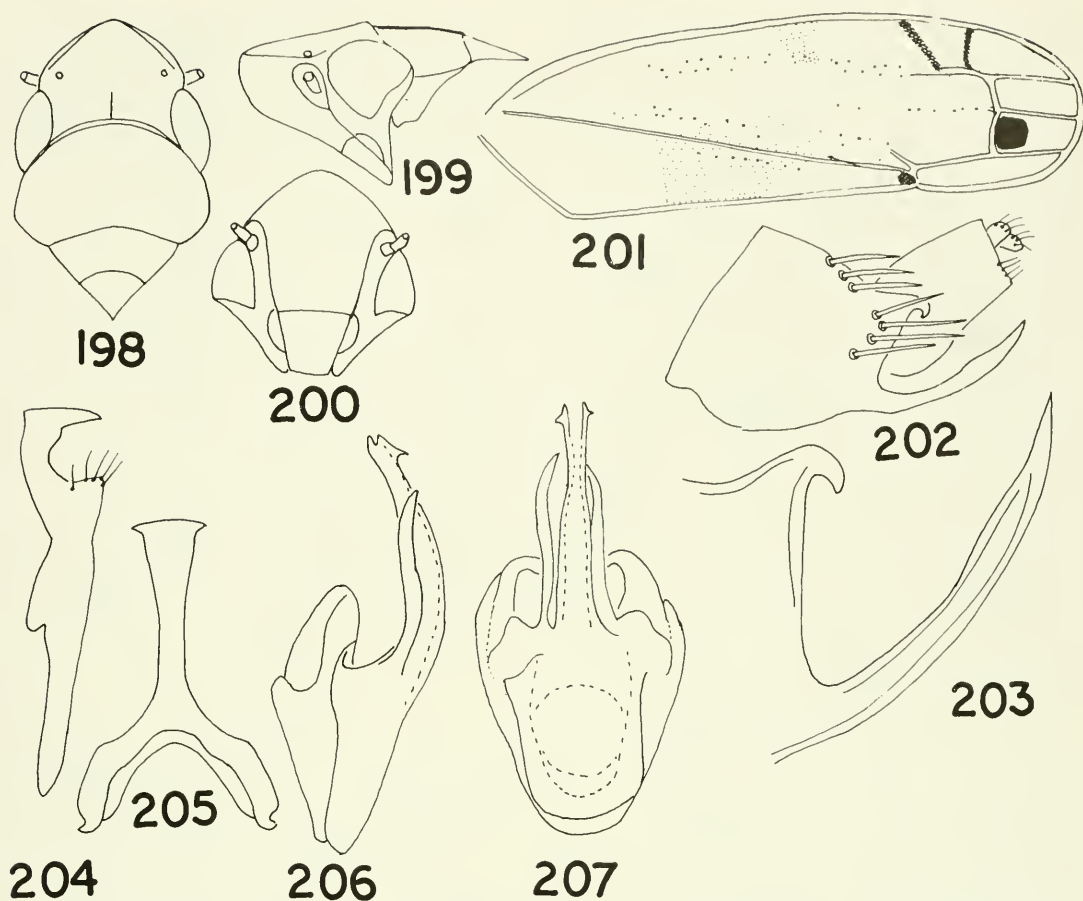
Sophonia complicata, n. sp.

Figs. 208–220

Whitish yellow. Area surrounding ocelli, lateral-most area of pronotum lemon yellow. Second apical cell with round, black spot. Costa with outer, oblique fascia, posterior, transverse fascia near apex, and apical margin of forewing fuscous. In a few specimens, median area of clavus pale fuscous, which meets fuscous stripe on claval suture and continues angularly across wing where it is joined by an oblique, fuscous fascia from costa. Hind tibial pecten fuscous.

Vertex more conically produced, disc convex with median carina in apical half and apical area rugulose, rugae crisscrossing. Vertex of female distinctly longer than male. Head wider than pronotum.

MALE GENITALIA.—Pygofer with caudodorsal angle roundly produced, with excavation below which long, slender process arises, directed caudally, upcurved at right angles at midlength, apex slightly hooked, bearing spinelike branch at base. Anal tube robust, slightly exceeding pygofer lobe, but not pygofer process. Plate 3.75 times as long as wide. Style with elongate, slender, preapical lobe, apophysis slender avicephaliform. Stem of connective more than twice as long as each arm. Aedeagus complex, two arms of dorsal apodemes well separated, winglike, completely covering entire length of shaft laterally, each arm with dorsomedian, caudal, and caudoventral, long processes; dorsomedian



Figs. 198–207. *Sophonia bifida*, n. sp.: 198, head and thorax; 199, same, profile; 200, face; 201, forewing; 202, male pygofer; 203, pygofer process; 204, style; 205, connective; 206, 207, aedeagus, lateral and caudal views.

process curves caudally, caudal process directed anteriorly and in contact with dorso-median process, caudoventral process crosses over caudad of shaft, thus enclosing it; shaft depressed, strongly curved anteriorly, expanded, and hoodlike.

MEASUREMENTS.—Male 4.40 (4.30–4.50) mm long, head 0.92 (0.90–0.95) mm wide, pronotum 0.94 (0.90–0.95) mm wide. Female 4.88 (4.60–5.10) mm long, head 1.01 (0.97–1.05) mm wide, pronotum 1.02 (1.00–1.05) mm wide.

SPECIMENS EXAMINED.—Holotype ♂, India: Mizoram: Lungleh, 23.xi.1981, C. S. Wesley (UAS). Paratypes: 15 ♂, 16 ♀, India: Mizoram: Aizawl, 18.xi.1981, C. S. Wesley; 3 ♂, 1 ♀, Lungleh, 22–24.xi.1981, C. S. Wesley; Meghalaya: 2 ♀, Cherrapunji, 1,299 m, 3.xi.1981, C. A. Viraktamath; 1 ♀, Shillong, 1,961 m, 3.xi.1981, S. Viraktamath

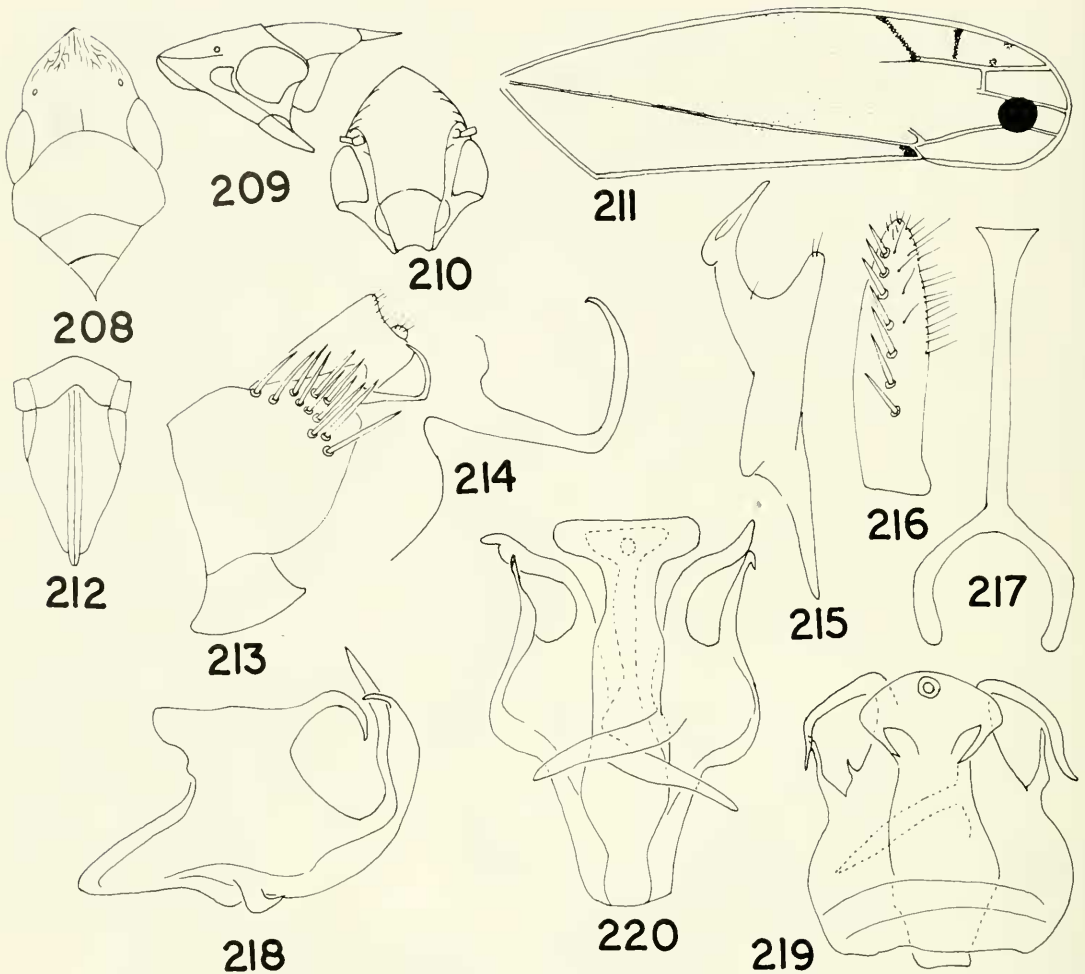
(1 ♂ and 1 ♀ paratypes in BMNH, IARI, USNM, ZSI, and rest in UAS).

REMARKS.—The complex nature of the aedeagus and the slender, long pygofer process distinguish this species from other species of *Sophonia*.

Genus *Nirvana* Kirkaldy

Nirvana Kirkaldy 1900d: 293. Type species: *Nirvana pseudommatos* Kirkaldy, by original designation and monotypy.

Vertex longer than width between eyes, disc depressed apically, with median ridge. Ocelli situated laterally mesad of submarginal carina. Face slightly depressed basally, frontoclypeus with short, apical, median ridge and lateral, oblique rugae weakly developed. Second apical cell of forewing narrowed apically. Hindwing with three apical, closed cells.



Figs. 208-220. *Sophonia complicata*, n. sp.: 208, head and thorax; 209, same, profile; 210, face; 211, forewing; 212, ovipositor; 213, male pygofer; 214, pygofer process; 215, style; 216, male plate; 217, connective; 218-220, aedeagus, lateral, caudal, and dorsal views.

Hind tibial spinulation R_1 20 ± 2 , R_2 12 ± 1 , R_3 12 ± 2 .

MALE GENITALIA.—Pygofer lobe caudally, bluntly conical or rounded, with ventral, short or long process, caudal area with numerous macrosetae. Plate parallel-sided, elongate, more than five times as long as wide near middle, with oblique row of macrosetae in apical 0.66 and hairlike setae. Style with well-developed preapical lobe; apophysis short, apical extension more than twice length, beaklike. Aedeagal shaft tubular, with or without processes, dorsal apodeme slender in cephalic view, U-shaped; gonopore apical.

REMARKS.—*Nirvana* and *Sophonia* are closely related and are difficult to separate

by external characters. *Nirvana* has a simple dorsal apodeme, usually without processes, whereas in *Sophonia* it is complex with more elaborate processes; the male plate in *Nirvana* is narrow and elongate compared to *Sophonia*. Specimens of *N. pseudommatos* were not available for the study, and hence the genus is only tentatively defined here.

Key to Species of *Nirvana*

1. Vertex with median, white stripe and lateral, orange or lemon yellow, submarginal stripe; aedeagal shaft with two slender, lateral, long, ventral processes directed ventrally (Figs. 225, 226) *pallida* Melichar
- Vertex with black line or lines or with orange, submarginal stripes traversing on pronotum and

- scutellum and forewing; aedeagus without processes (male of *pseudommatos* is not known) . . . 2
- 2(1). Vertex, pronotum, scutellum traversed by pair of orange stripes (Fig. 256); male pygofer caudally produced into an acute, dorsally curved process (Fig. 261); anal tube with two stout spines (Fig. 262) *peculiaris*, n. sp.
- Vertex, pronotum, and scutellum traversed by black lines or stripes; male pygofer and anal tube unarmed (not known in *pseudommatos*) 3
- 3(2). Vertex, pronotum, scutellum, and anal margin of forewing traversed by broad, black stripe 4
- Vertex of head and pronotum traversed by three black stripes; scutellum by a median, black line; apex of vertex with blackish brown spot connected by the stripes *pseudommatos* Kirkaldy
- 4(3). Median stripe with irregular margins (Figs. 233, 234); spot on second apical cell of forewing small (Fig. 243); dorsal apodeme of aedeagus simple (Fig. 240) *suturalis* Melichar
- Median stripe with an even margin (Fig. 244); spot on second apical cell of forewing large (Fig. 248) extending to first apical cell; dorsal apodeme of aedeagus with a basal, short process (Fig. 254) *striata*, n. sp.

Nirvana pallida Melichar

Figs. 221–232

Nirvana pallida Melichar 1903b: 166. Syntype ♂, ♀, Sri Lanka (not examined).

Quereinirvana bengalensis Ahmed & Mahmood 1970: 263. Holotype ♂, Bangladesh (University of Karachi, not examined). *New synonymy*.

Coloration as described by Melichar (1903b). The median, white stripe of vertex may be obscured in some specimens.

Head as wide as or slightly narrower than pronotum. Vertex 1.5 to 2.0 times as long as width between eyes, disc slightly depressed. Clypellus convex.

MALE GENITALIA.—Pygofer lobe caudally rounded with marginal macrosetae, ventral process long, dorsally directed with rounded apex. Plate narrowed caudally with bluntly conical apex. Preapical lobe of style rounded, stout. Stem of connective longer than arms. Aedeagus with dorsal apodeme well developed, consisting of two arms and forming a U, shaft tubular, curved slightly with short, spinelike, laterally directed, terminal processes and long, unpaired, ventrally directed, subapical process.

FEMALE GENITALIA.—Hind margin of seventh sternum rather straight. Ovipositor slightly exceeding pygofer.

MEASUREMENTS.—Male 4.80 (4.60–5.00) mm long, head 0.94 (0.90–0.98) mm wide,

pronotum 1.02 (0.95–1.08) mm wide. Female 5.65 (5.5–5.80) mm long, head 1.06 (1.05–1.07) mm wide, pronotum 0.93 (0.88–0.98) mm wide.

SPECIMENS EXAMINED.—India: 203 ♂, 274 ♀, collected from the states of Andhra Pradesh, Haryana, Karnataka, Kerala, Maharashtra, Meghalaya, Mizoram, Sikkim, Tamil Nadu, and West Bengal from January to December, from sea level (Cochin in Kerala) to 2,250 m (Kodaikanal in Tamil Nadu) above sea level. Nepal: 1 ♀, Sarankot, 17.xi.1979, I. Dworakowska. Sri Lanka: 1 ♀, Peradeniya, 23.viii.1979, I. Dworakowska (UAS).

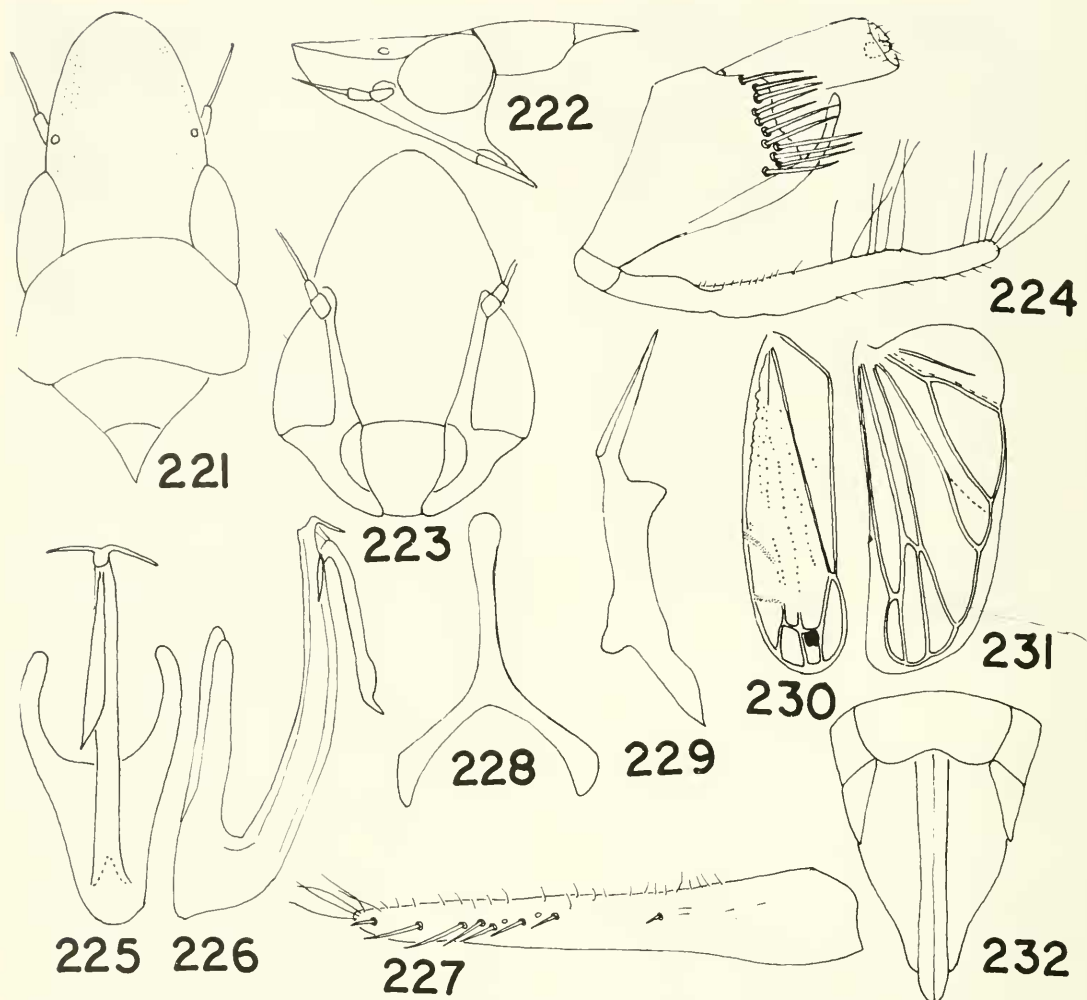
REMARKS.—This species is the most common and most frequently encountered Nirvaninae on the Indian subcontinent. It breeds on newly emerged leaves of *Tecoma stans*, *Duranta* sp., *Vitis vinifera*, beans, pigeon pea, etc. The species is identified based on the description and illustrations provided by Melichar (1903b). No other species of Nirvaninae has the color and elongate male plate with two short, lateral, and caudal processes on the aedeagal shaft. The synonymy of *Q. bengalensis* is based on the illustrations of male genitalia of the species provided by Ahmed and Mahmood (1970) and on the specimens collected from northeastern India. None of the specimens collected, however, has “a pair of median stripes blackish pale to pale brown, running from anterior tip of crown to posterior margin of pronotum.” Based on the illustrations, *Pseudonirvana rubrolimbata* Kuoh & Kuoh may also prove to be a synonym of this species.

Nirvana suturalis Melichar

Figs. 233–243

Nirvana suturalis Melichar 1903b: 166. Holotype ♀, Sri Lanka (ZMHU, examined).

Yellow. Median, longitudinal, black stripe traversing vertex, pronotum, scutellum and continued along inner margin of clavus of forewing, with uneven, lateral margins and extending angularly on corium beyond clavus (stripe constricted a short distance from apex of vertex in Indian specimens but not in holotype female) (Figs. 233, 234). First, second, and outer margin of fourth apical cells of forewing dark brown, costal margin with piceous, oblique fascia about 0.25 distance from apex; second apical cell with black spot. Ventral surface of body creamy white.



Figs. 221–232. *Nirvana pallida* Melichar: 221, head and thorax; 222, same, profile; 223, face; 224, male pygofer; 225, 226, aedeagus, caudal and lateral views; 227, male plate; 228, connective; 229, style; 230, forewing; 231, hindwing; 232, ovipositor.

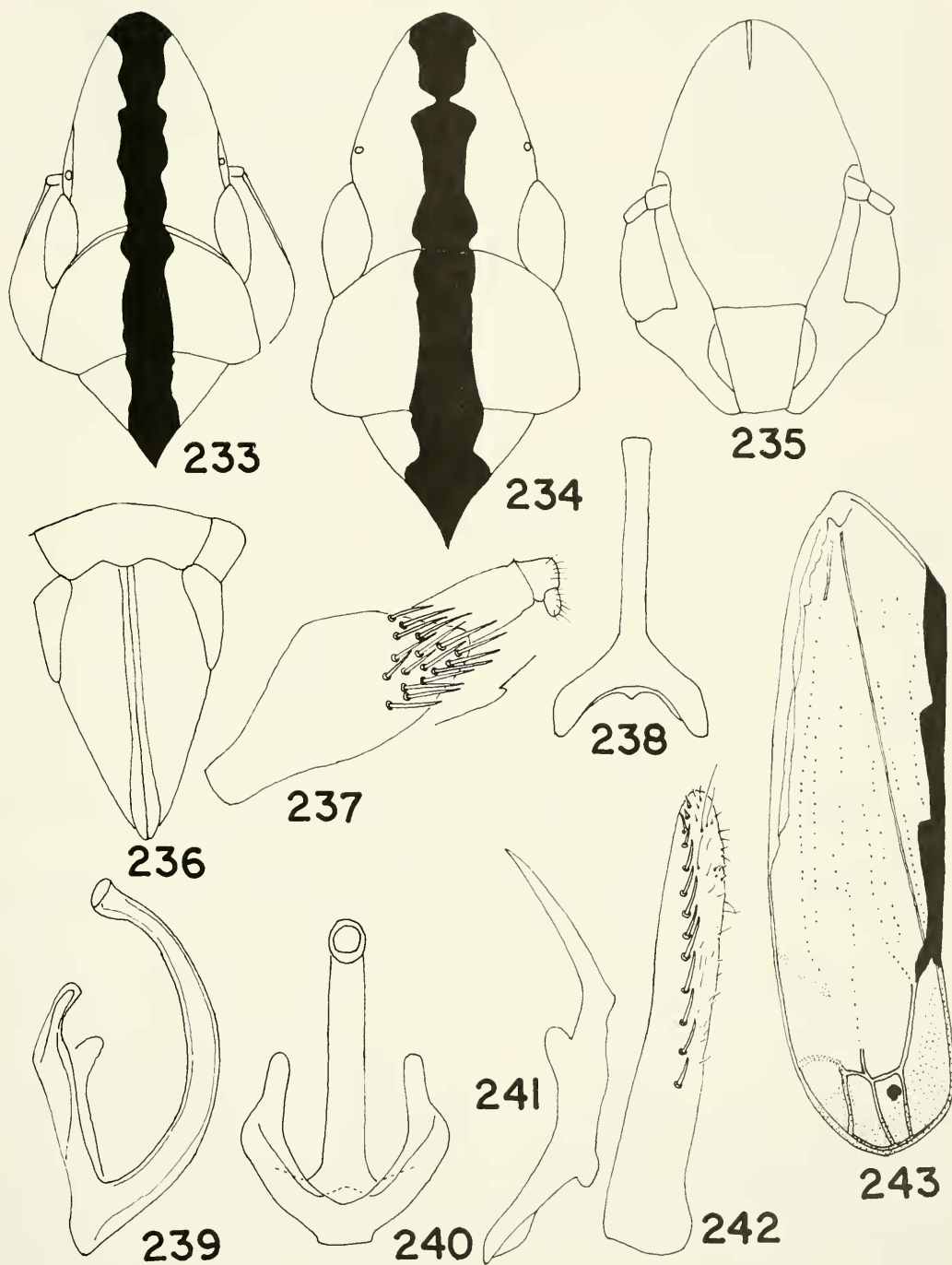
Head narrower than pronotum. Vertex about 1.5 times as long as width between eyes, with median, longitudinal groove not reaching apex, rugulose in anterior half, posterior half polished.

MALE GENITALIA.—Pygofer bluntly conical caudally, with ventral, short notch, macrosetae confined to apical 0.33 area. Plate more than six times as long as wide. Preapical lobe of style rounded, relatively slender. Stem of connective twice as long as length of each arm. Aedeagus with short preatrium, shaft tubular, slightly curved, each arm of dorsal apodeme wider in middle.

FEMALE GENITALIA.—Hind margin of seventh sternum concave with median, short protuberance. Ovipositor exceeding pygofer.

MEASUREMENTS.—Male 4.20 (4.00–4.30) mm long, head 0.85 (0.83–0.88) mm wide, pronotum 0.88 (0.85–0.90) mm wide. Female 4.74 (4.40–5.00) mm long, head 0.90 (0.80–0.95) mm wide, pronotum 0.93 (0.88–0.98) mm wide.

SPECIMENS EXAMINED.—Holotype ♀ labeled /Type/ /7042/ /Ceylon, Nietr./ /suturealis, det. Melichar/ /*Nirvana suturalis* Melichar/ (ZMHU). India: 48 ♂, 66 ♀, collected from the states of Karnataka, Kerala,



Figs. 233–243. *Nirvana suturalis* Melichar: 233, head and thorax of holotype female; 234, female from India; 235, face; 236, ovipositor; 237, male pygofer; 238, connective; 239, 240, aedeagus, lateral and cephalic views; 241, style; 242, male plate; 243, forewing.

and Tamil Nadu from January to December, at an altitudinal range of 534 m (Jog Falls in Karnataka) to 2,350 m (Ootacamund in Tamil Nadu) above mean sea level.

REMARKS.—This is the second most commonly collected Nirvaninae in southern India. *Nirvana suturalis* and *N. striata* are very closely related. Both differ from other species of *Nirvana* and *Sophonia* in having a broad, black, median stripe running from the apex of the vertex to the corium, but the stripe is not as broad as in species of *Chudania*. *Nirvana suturalis* has a serrated lateral margin to the median stripe compared to the smoother lateral margin in *N. striata*.

Nirvana striata, n. sp.

Figs. 244–255

Coloration as in *N. suturalis*, median stripe more or less of uniform width and even margined, black spot on second apical cell of forewing, larger than in *N. suturalis*, extending to first apical cell.

Head narrower than pronotum. Vertex slightly longer than width between eyes, anterior half sparsely rugulose. Pronotum slightly more than 1.5 times as wide as long, longer than scutellum.

MALE GENITALIA.—Pygofer bluntly conical with macrosetae confined to caudal 0.33 area, ventral margin with short, spinelike process. Plate caudally rounded, about seven times as long as wide. Style with rounded preapical lobe, apical extension of apophysis beaklike and long. Stem of connective twice as long as each arm. Aedeagus with shaft strongly curved (more than in *N. suturalis*), apex abruptly directed cephalad and with membranous area; each arm of dorsal apodeme with basal, short process.

FEMALE GENITALIA.—Hind margin of seventh sternum straight. Ovipositor exceeding pygofer.

MEASUREMENTS.—Male 4.90 (4.80–5.00) mm long, head 0.98 (0.95–1.00) mm wide, pronotum 1.06 (1.05–1.08) mm wide. Female 5.46 (5.30–5.60) mm long, head 1.08 (1.05–1.10) mm wide, pronotum 1.12 (1.08–1.13) mm wide.

SPECIMENS EXAMINED.—Holotype ♀, India: West Bengal: Kurseong, 1,483 m, 22.x.1981, S. Viraktamath (UAS). Paratypes: India: Uttar Pradesh: 1 ♀, Mussoorie, 2,005 m, 27.iv.1975, C. A. Viraktamath; Himachal

Pradesh: 3 ♀, Simla, 2,133 m, 14.x.1979, C. A. Viraktamath; West Bengal: 3 ♂, 3 ♀, Kurseong, 1,483 m, 22.x.1981, S. Viraktamath (1 ♂, 1 ♀) and C. A. Viraktamath (2 ♂, 2 ♀); 1 ♀, 15 km E of Kalimpong, 1,780 m, 27.x.1981, S. Viraktamath; 1 ♂, 2 ♀, 8 km E of Kalimpong, 1,768 m, 29.x.1981, C. A. Viraktamath (1 ♂ and 1 ♀ paratypes in BMNH, USNM, and rest in UAS).

REMARKS.—See *N. suturalis*.

Nirvana peculiaris, n. sp.

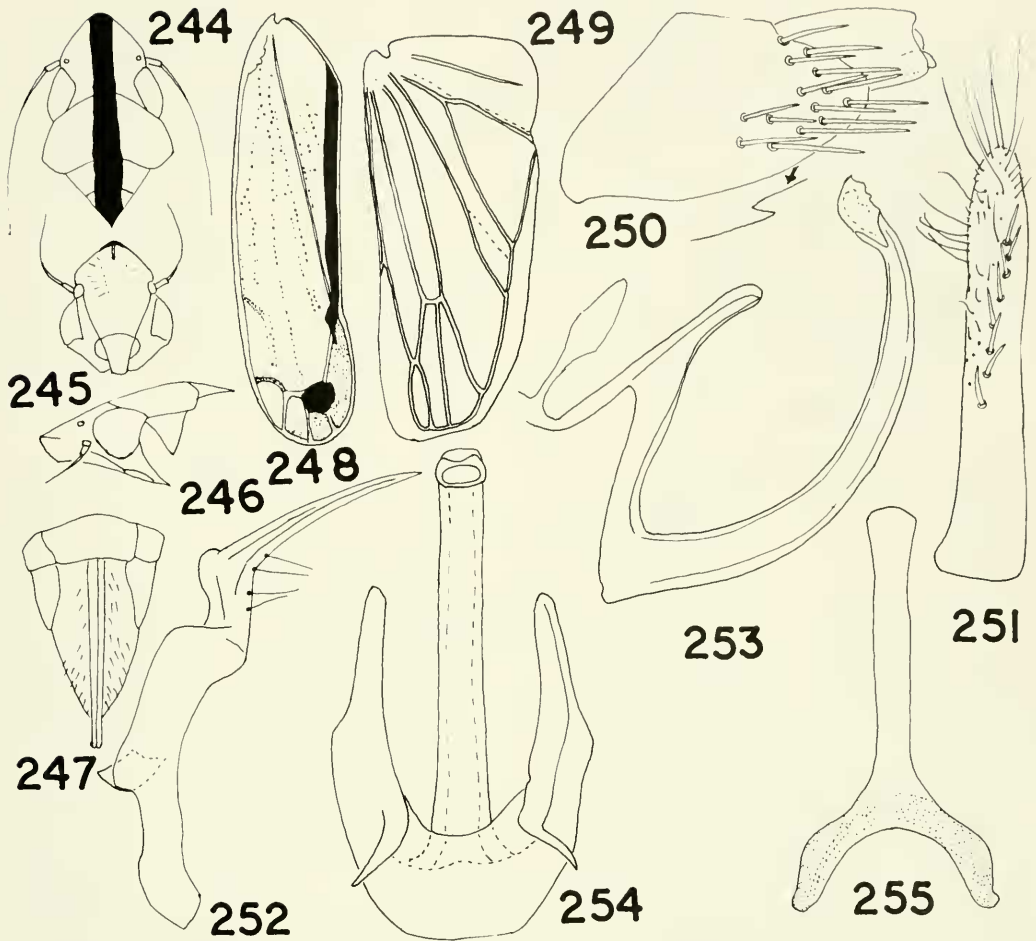
Figs. 256–267

Yellow. Small, black spot at apex of vertex visible both dorsally and ventrally (absent in female from Shillong). Fuscous, median stripe extending posteriorly to 0.25 length (absent in some females). Lateral, orange stripe on vertex mesad of ocelli, continued on pronotum, scutellum and then on to inner claval margin where they converge and continue to apex of clavus; outer margin of stripe on clavus often fuscous. Transverse spot at apex of clavus, small spot at apex of inner, anteapical cell, and anterior, oblique fascia from costa fuscous. Black spot on each caudodorsal angle of male pygofer.

Head as wide as pronotum or slightly narrower. Disc of vertex depressed with rolled-up, sharp margin, basal half with median sulcus, apical half with a carina, apical half of disc very finely pitted, posterior half with minute rugulae on polished surface.

MALE GENITALIA.—Pygofer elongate, narrowed caudally to acute, dorsally curved process. Anal collar elongate, anterior margin armed with two pronglike processes on each side. Setae on pygofer confined to caudodorsal area where it articulates with anal tube. Male plate elongate, 5.4 times as long as median width, macrosetae and hairlike setae confined to apical half. Connective robust, stem broad, and arms as long as stem. Apophysis of style fairly long. Aedeagus with dorsal apodeme poorly developed, shaft tubular, narrowed caudally, strongly curved dorsally near apex and with elongate, caudoventrally directed process and two lateral, anteriorly directed processes surrounding small gonopore.

MEASUREMENTS.—Male 5.80 (5.70–5.90) mm long, head 1.23 (1.22–1.25) mm wide, pronotum 1.24 (1.22–1.25) mm wide. Female 7.40 (7.00–7.80) mm long, head 1.50 (1.45–



Figs. 244–255. *Nirvana striata*, n. sp.: 244, head and thorax; 245, face; 246, profile; 247, ovipositor; 248, forewing; 249, hindwing; 250, male pygofer; 251, male plate; 252, style; 253, 254, aedeagus, lateral and cephalic views; 255, connective.

1.55) mm wide, pronotum 1.54 (1.50–1.60) mm wide.

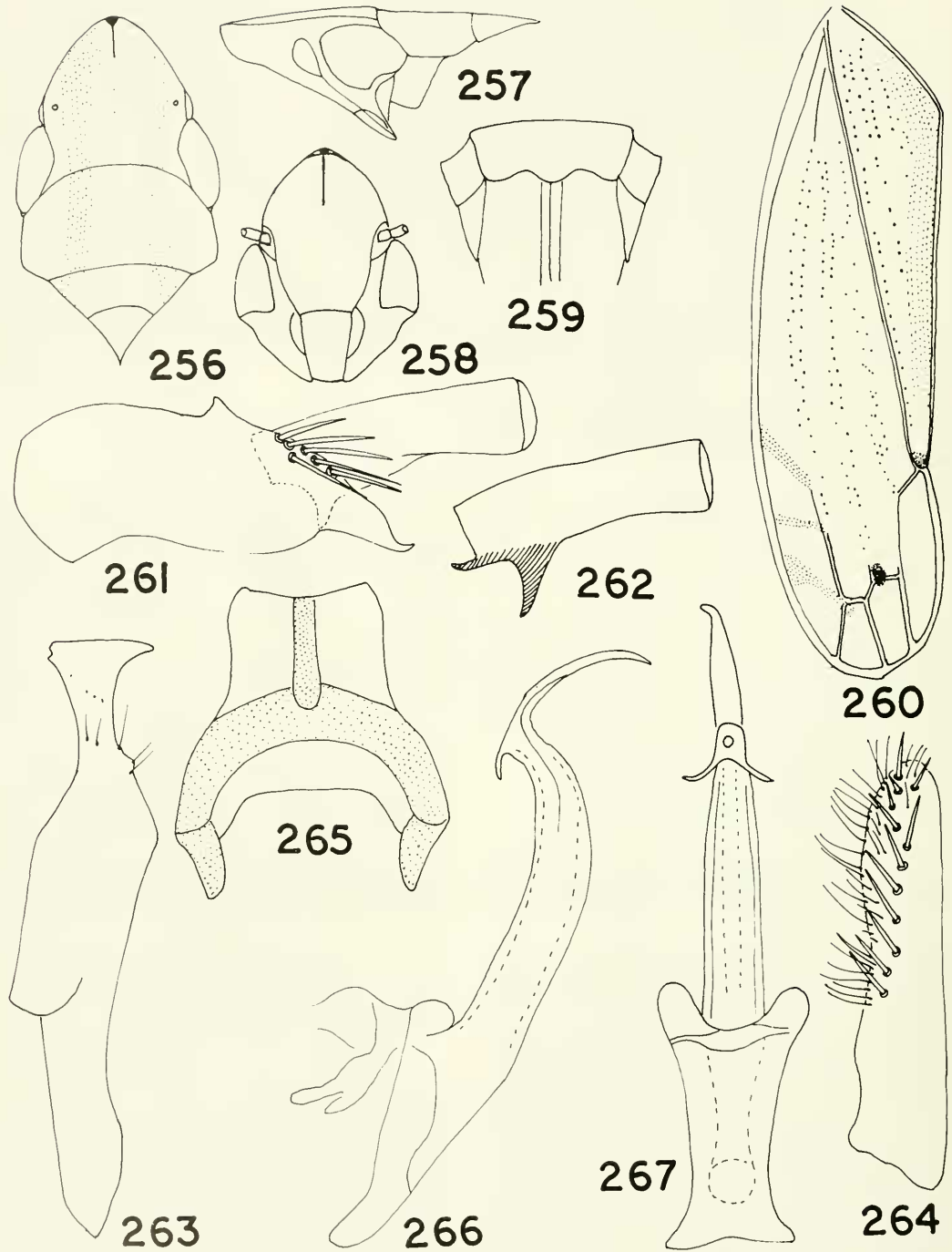
SPECIMENS EXAMINED.—Holotype ♂, India: Mizoram: Aizawl, 18.xi.1981, C. S. Wesley (UAS). Paratypes: India: Mizoram: 2 ♂, 4 ♀, Aizawl, 18.xi.1981, C. S. Wesley; 1 ♂, 2 ♀, Lungleh, 23.xi.1981, C. S. Wesley; Meghalaya: 1 ♀, Shillong, 1,961 m, 3.xi.1981, S. Viraktamath (1 ♀ and 1 ♀ paratypes in BMNH; 1 ♀ paratype in IARI, USNM, ZSI, and rest in UAS).

REMARKS.—This species is unique among Nirvanini in having an armed tenth segment. In coloration it resembles species of *Kana*, especially *K. fasciata*, but it differs from those species in having three apical cells in the hindwing and unique male genitalia.

Ophiuchus Distant

Ophiuchus Distant 1918b: 33. Type species: *Ophiuchus princeps* Distant, by original designation and monotypy.

Pale yellow with bright, contrasting coloration of black and red or pink. Head about as wide as pronotum, spatulate, disc of vertex depressed in middle, margined by carina, lateral margin of vertex straight in front of eyes to ocelli where it is widened and then slightly narrowed to apex. Face with five lateral ridges, concave medially, with short, median carina near apex. Pronotum twice as wide as median length, disc minutely, transversely rugose. Hindwing with three closed apical cells. R_2 of hind tibia with 12 spines.



Figs. 256-267. *Nirvana peculiaris*, n. sp.: 256, head and thorax; 257, same, profile; 258, face; 259, female seventh sternum; 260, forewing; 261, male pygofer; 262, male tenth segment; 263, style; 264, male plate; 265, connective; 266, 267, aedeagus, lateral and cephalic views.

Male pygofer elongate, heavily macrosetose and with caudal, hooklike process. Valve semicircular. Plate rounded apically, macrosetae scattered and confined to caudal 0.40. Style appearing like partially closed fist. Aedeagus large, poorly sclerotized, with ventral, platelike process, shaft short, cylindrical with large gonopore.

REMARKS.—This genus appears related to *Sophonia* and *Nirvana* with which it shares general facies of the head. The peculiarly shaped style and scattered macrosetae on the male plate distinguish this genus.

Ophiuchus princeps Distant

Figs. 265–276

Ophiuchus princeps Distant 1918b: 34. Lectotype ♂, India (BMNH, examined).

Pale yellow. Vertex laterally margined by black line that does not reach apex, black, median, longitudinal line does not reach apex. Eyes centrally fuscous surrounded by red. Ocelli red. Face ochraceous with lateral infoldings black. Pronotum sanguineous with submarginal, anterior, transverse, whitish spot. Scutellum anteriorly marked with fuscous band with backward, lateral projections. Base of forewing fuscous, apical 0.33 with an irregular, pink spot margined by fuscous, rest yellowish.

Head shorter than combined length of pronotum and scutellum (36:44). Pronotum shorter than scutellum (21:23). Face longer than wide.

MALE GENITALIA.—Pygofer elongate, lobe covered with numerous stout setae and terminated by curved, hooklike process. Valve semicircular. Plate elongate, with angulate projection on lateral margin near apex. Style flat, preapical lobe with few setae, apophysis with two angular projections and apically pointed. Aedeagus with very short, dorsal apodeme, elongate, platelike, ventral process, armed with median ridge and two caudal, spinelike processes on its laterocaudal angles, shaft short, cylindrical, with large, round gonopore and with pair of lateral processes about its midlength.

MEASUREMENTS.—Male 4.60 mm long, head 1.07 mm wide, pronotum 1.05 mm wide.

SPECIMEN EXAMINED.—Lectotype ♂ labeled /Travancore/ /Distant Coll. 1911–383/

/ *Ophiuchus princeps* Dist., type/ here designated (BMNH).

REMARKS.—This species has a very distinctive coloration not possessed by any other species of Nirvaninae known from the Indian subcontinent nor by any other species of *Ophiuchus* known from the Oriental region and Australia. The male genitalia of *Ophiuchus* species except *O. distanti* Evans (1973: Fig. 5B) are not sufficiently known to suggest any relationships among them. Judging from the illustrations of *O. distanti*, it does not appear to be related to *O. princeps*.

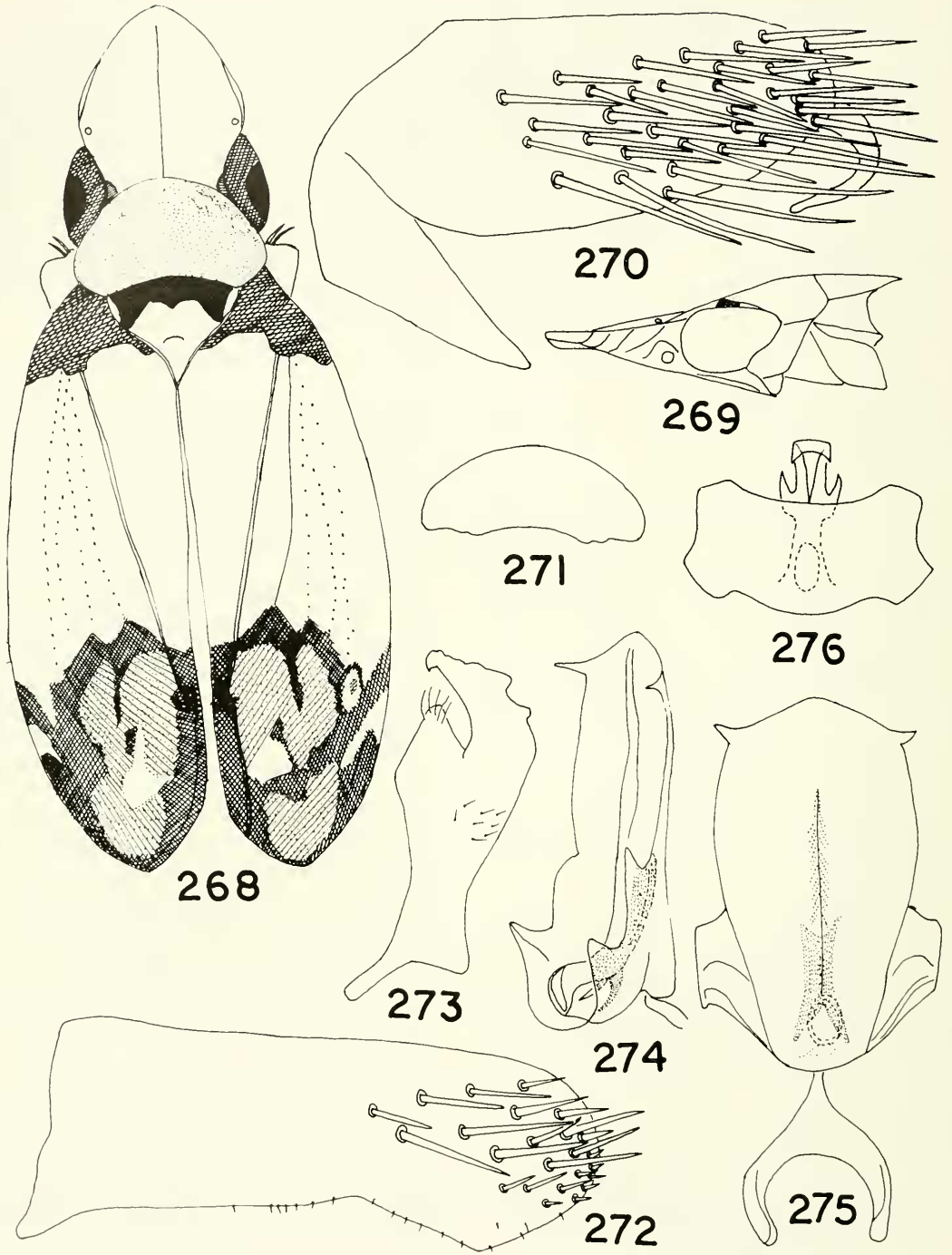
Tribe Occinirvanini

Body elongate, slightly depressed. Head produced anteriorly, spatulate. Face horizontal, frontoclypeus and clypellus either flat (*Occinirvana* Evans) or convex; facial sulci deep, prominent; face longer than wide, genae laterally emarginate below eyes, lora fairly prominent.

Antennae arising close to anterior margin of head. Vertex elongate, with median sulcus and transverse ridge or carina across ocelli, which are situated on disc of vertex closer to anterior than to posterior margin. Lateral margin of pronotum rounded, without carina, rather parallel-sided. Forewing with complete and prominent venation; at least three cross-veins reaching vein R from costal margin; anteapical cells three, outer anteapical cell half as long as median, inner anteapical cell open basally; apical cells four; appendix distinct, often extending around apical margin as in *Omaranus* Distant. Hindwing with three apical cells. Hind femoral spinulation 2+1+0. Hind basitarsus with six platellae (in *Omaranus*).

Male genitalia is of deltocephaline type. Pygofer laterally not fused with valve, lobe covered by stout setae. Valve triangular. Plates triangular with stout macrosetae. Style deltocephaline type with well-developed, preapical lobe and fingerlike apophysis. Connective Y-shaped with diverging arms. Aedeagus simple, with large gonopore, articulated with connective.

REMARKS.—The tribe, judged from the structural features, is not closely related to either Nirvanini or Balbillini. It has several deltocephaline features, especially the male genitalia.



Figs. 268–276. *Ophiuchus princeps* Distant: 268, habitus; 269, profile; 270, male pygofer; 271, male valve; 272, male plate; 273, style; 274, aedeagus, lateral view; 275, aedeagus and connective, ventral view; 276, aedeagus, cephalic view.

Genus *Omaranus* Distant

Omaranus Distant 1918b: 5. Type species: *Omaranus typicus* Distant, by original designation and monotypy.

Didius Distant 1918b: 36. Type species: *Didius sexualis* Distant, by original designation and monotypy.

Sexually dimorphic. Head narrower than pronotum in male, wider than pronotum in female. Vertex with median carina in apical half, sulcus in basal half. Face longer than broad, frontoclypeus tumid. Clypellus longer than broad; frontoclypeus, lora, genae, and clypellus with scattered, short setae. Pronotum gradually widened posteriorly in male, parallel-sided and with faint, median ridge near posterior half in female; posterior margin strongly inwardly concave; disc flattish in female, slightly raised posteromedially in male, lateral margins not carinate. Male forewing exceeds abdomen, appendix runs around apical margin, with four apical and three antepical cells; hindwing well developed with three apical cells. Female forewings cover only three basal, visible, abdominal terga, while hindwings cover two basal, visible terga; appendix wanting. Hind tibial spinulation R_1 16 ± 2 , R_2 10 ± 1 , R_3 3. Hind basitarsus shorter than combined length of second and third tarsi and terminated by six platellae.

Male pygofer without processes. Tenth segment stout, rather short. Ovipositor not exceeding pygofer.

REMARKS.—This genus and the Australian *Occinirvana* are closely related. The shape of the head differentiates the two genera.

Omaranus typicus Distant

Figs. 277–289

Omaranus typicus Distant 1918b: 6. Lectotype ♂, India (BMNH, examined).

Didius sexualis Distant 1918b: 36. Lectotype ♀, India (BMNH, examined).

MALE.—Ochraceous (probably green in life). Anterior margin of vertex narrowly black margined, with median, black spot, two smaller, somewhat elongate spots near posterior margin, ocelli black. Dorsal-most area of frontoclypeus and face ventrad of antennal bases, blackish brown, marginal band dorsad of antennal base and longitudinal stripe on proepimeron blackish brown. Apical 0.25 of forewing and stripe along inner margin fuscous. Abdomen with four black stripes; sterna marked with brown stripes. Apical half of hind

femora ventrally streaked with brown. A ventral spot near apex of fore femora black.

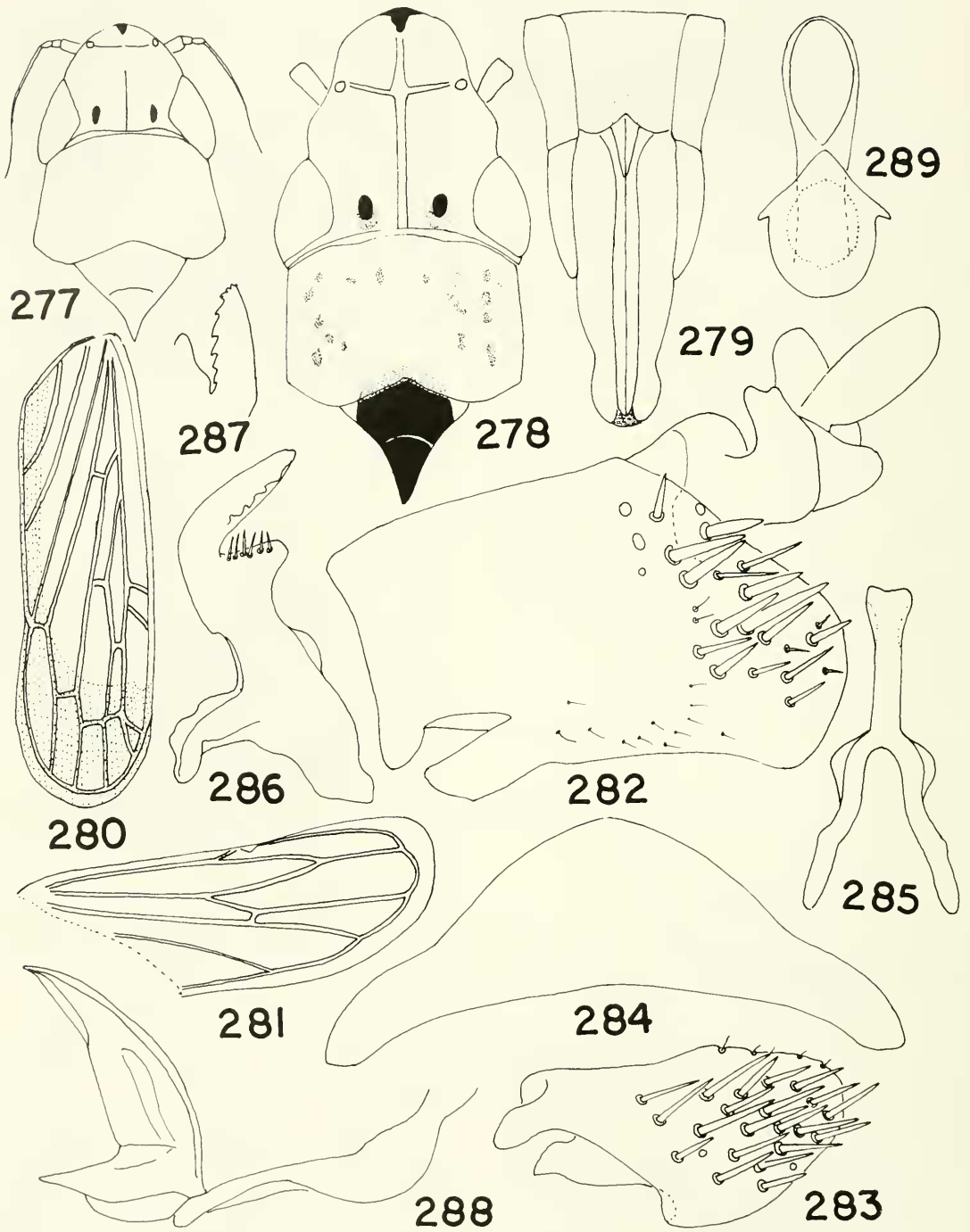
GENITALIA.—Pygofer lobe caudoventrally produced, caudodorsal area beset with stout, short setae. Plate caudally rounded with scattered, stout setae. Valve straplike with caudal margin roundly and medially produced. Apophysis of style curved laterally with series of teeth on lateral margin. Stem of connective 0.75 as long as each arm. Aedeagus with short, dorsal apodeme, shaft stout at base, narrowed caudally in lateral aspect with a large gonopore on dorsal aspect.

FEMALE.—Ochraceous. Head with median spot on anterior margin, ocelli, and two spots near base of vertex black; median stripe, a transverse band across ocelli, hind margin, except medially, and two spots in front of eyes reddish. Dorsal margin of face black from which two apically divergent stripes traverse face. Proepisternum traversed by longitudinal, piceous stripe, much longer on propisternum; mesopleura and mesocoxae with piceous spot. Pronotum with scattered, dark brown spots, with obscure stripes, two lateral and two median reddish. Scutellum except for two lateral, basal angles in basal half black, apical half blackish brown. Forewing veins marked with red. Fore tibiae and tarsi reddish; fore- and mesothoracic femora black, mesocoxae with piceous spot. Abdominal coloration as in male.

GENITALIA.—Hind margin of seventh sternum with median, U-shaped excavation and translucent in middle. Anal segment concealed by pygofer.

MEASUREMENTS.—Male 4.30 mm long, head 1.00 mm wide, pronotum 1.10 mm wide. Female 7.90 mm long, head 1.00 mm wide, pronotum 1.10 mm wide.

SPECIMENS EXAMINED.—Lectotype ♂ labeled / Calcutta, 28.viii.07, Mus. Coll. / *Omaranus typicus* Dist., type/ here designated. Paralectotype ♂ labeled / Calcutta, 23.viii.07/ *Omaranus typicus* Dist., type/ here designated. Paralectotype has the abdomen and left fore and hindwings missing. Lectotype ♀ labeled / Calcutta/ /Distant Coll. 1911–384/ *Didius sexualis* Dist. type/ here designated (BMNH). India: Punjab: 1 ♂, 1 ♀ nymph, Ludhiana, 13.ix.1966, A. S. Sohi (PAU). India: Madhya Pradesh: 3 ♂, 18 ♀, Nebudda Survey, Sta. No. 31, 37, 58, 21.ii–9.iii.1927, H. S. Pruthi (ZSI).



Figs. 277-289. *Omaranus typicus* Distant: 277, head and thorax of lectotype male; 278, same of lectotype female, *Didius sexualis* Distant; 279, ovipositor; 280, 281, fore and hindwings of male; 282, male pygofer; 283, male plate; 284, male valve; 285, connective; 286, style; 287, 288, aedeagus, lateral and cephalic views.

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